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Heavy Pig Iron Buying Cheers the Market

Large Tonnages of Steel Making Iron Placed—Agricultural Implement Companies Contract for Nuts and Bolts

BY GEORGE SMART

Heavy buying of pig iron in leading iron centers has brought great encouragement to the entire trade and furnishes strong evidence that prosperity will be enjoyed throughout the remainder of the year. The very favorable reports of earnings by the Steel Corporation, by the Republic Iron & Steel Co. and other independents, show that in spite of the decreased buying of the past six months, business is really on a prosperous basis, and with the return of active buying, much greater profits are in prospect.

Pig Iron

Within a few days, purchases of steel-making pig iron in the Pittsburgh and Youngstown districts have aggregated nearly 100,000 tons, the principal purchase being that of the Youngstown Sheet & Tube Co., which took from Mahoning valley furnaces 75,000 tons, divided equally between basic and Bessemer, the prices being about $14.40, delivered, for the basic, and $15.65 for the Bessemer. The Andrews Steel Co., Newport, Ky., bought about 15,000 tons of basic, and the Jones & Laughlin Steel Co. took 5,000 tons of prompt basic and the American Steel Foundries 1,500 tons. A St. Louis buyer has taken 10,000 tons of Alabama basic at $11, Birmingham. In eastern territory, including lower New England, sales of various grades of pig iron during the past two weeks have amounted to nearly 100,000 tons. Buffalo sellers have been extremely active and have booked large tonnages. The largest single order in the recent transactions in the east was for 20,000 tons of malleable taken by the Malleable Syndicate for New England plants. About half of this tonnage came from Buffalo and the remainder from another New York state company. The price was on the basis of $13.50, Buffalo. A sale of 6,000 tons of malleable and numerous minor sales have since been made on the basis of $14, Buffalo. The advancing tendency of the Buffalo market has strengthened the whole pig iron situation in the east. Evidence accumulates that the eastern Pennsylvania pig iron market has struck bottom. Inquiry in that section is fairly good. The Virginia market is still irregular, but will probably be readjusted soon to higher levels. In the south, there is increased firmness and quotations range from $10.50 to $11, Birmingham, for strictly No. 2 foundry.

Coke

The strength of the coke market has been a factor in adding to the firmness of pig iron. Coke producers in the Connellsville region are standing solidly for $2.50 for furnace coke for the last half and a number of sales, including one for 6,000 tons, have been made for August delivery at that figure. A general advance has taken place on both furnace and foundry grades in the Pocahontas and New River districts. Pocahontas foundry is now quoted at $3 per ton and furnace at $2.60 to $2.75.

Pipe

The merchant pipe market is stronger. An Ohio pipe maker has taken an order for 200 miles of 12-inch pipe for the Louisville gas line and orders for 150 miles of from 8-inch to 18-inch have been placed with several makers in the Pittsburgh district. R. D. Wood & Co. have been awarded about 10,000 tons of cast iron pipe and specials for the extension to the New York high pressure system. The same company has taken 1,275 tons for Schenectady, N. Y. Financial difficulties still apparently defer the making of municipal contracts for cast iron pipe.

Nuts and Bolts

Nut and bolt demand has advanced sharply during the past few days and some very large contracts, including one for 60,000,000 nuts and bolts, have been made with agricultural implement companies. There is a fairly active demand for rivets and prices are not as irregular as they were a short time ago.

Railroad Buying

An interesting development in railroad buying has been the action of the New York Central and a leading western line in advising rail makers that they are preparing their estimates for 1914 rail requirements. Railroads, remembering the delays which have occurred this year in delivering rails, will endeavor to obtain early position on the rolling schedules of steel mills. The Lehigh Valley has ordered 1,100 tons of bridge material.

COKE RATE REDUCTION

Brings Up Discussion of Some Important Points.

Washington, July 29.—Voluntary reduction of coke rates of 10 cents per net ton from the Connellsville region to what is known in the trade as the Wheeling district has created much speculation. The new rate, effective Aug. 25, has been filed with the Interstate Commerce Commission by the Baltimore & Ohio Railroad Co., and is $1.20 per net ton. Filing of the tariffs by the Baltimore & Ohio means that other lines serving the same territory either directly or by connections, will follow. The new rate affects such points as Wheeling and Benwood, W. Va.; Bellaire, Martins Ferry and Steubenville, O.

These rates meet those to be established on the same date from the Fairmont district, which are to be reduced 10 cents also. In addition to this, the carriers serving the Fairmont district will make proportionate reductions to such points as Youngstown, Cleveland and Toledo. These cuts are voluntary and are made to meet those ordered to these points from the Connellsville region in the recent decision of the Interstate Commerce Commission in the Coke Producers' Case. But points east, such as Philadelphia, Reading, Newark, N. J., and Sparrows Point, ordered reduced by the decision, are to carry the same rates from the Fairmont district. The commission's order has been complied with, all the tariffs being on file.

This action maintains the identical competition between the points affected which existed between the Connellsville and Fairmont districts. In its decision, the commission held that the present relationship of rates as between the Connellsville district and the Fairmont district in West Virginia is not unduly discriminatory against Connellsville or unduly preferential to Fairmont and must be maintained. Whether the Connellsville interests will made a protest against the proposed alignment is a matter of conjecture. The rates the commission ordered reduced, wherein the Connellsville region only was affected, become effective Aug. 1. This reduction gives Youngstown a rate of $1.20, the proposed new rate voluntarily made to the Wheeling district.

The fact that the Baltimore & Ohio originates coke in the Fairmont district may have led it to take the initiative in reducing the rate from that territory to the Wheeling district. It has also been claimed that the voluntary reduction to the Wheeling district was a conciliatory move following the increased ore rate from the lake to Wheeling by which an advance of 28 cents per ton is proposed.

No new development in the ore rate case has taken place. The matter of the Pittsburgh Steel Co. filing a protest against the nominal reduction of 8 cents a ton to Pittsburgh has been delayed pending consideration of certain points.

Contention has been made that there was no practical reason why the coke rates from the Fairmont district to any points affected in the Coke Producers' decision should be reduced. It was pointed out in this connection that the industry in the Fairmont district was largely a by-product activity. The relative tonnages between Fairmont and Connellsville shows an extremely small percentage of the former. In 1911 the tonnage shipped from the Fairmont district was only 490,780 tons, while the Connellsville total was 16,334,174 tons. The total movement to Pittsburgh and west from the Connellsville and West Virginia district was 16,612,729 tons, of which 14,782,221 tons moved from Connellsville and 159,859 tons from Fairmont district. Shipped to the east from the Fairmont district were 330,921 tons, this being the principal market for the Fairmont district, and it remains unchanged as to rates. To Pittsburgh and to all that section of Ohio from Cleveland south to Zanesville, Connellsville supplied 95.5 per cent of the total tonnage. Whether this percentage will be reduced and the Fairmont percentage increased following the action of the carriers in cutting the rates from Fairmont raises an interesting point.

It is the opinion of the commission, as cited in the Coke Producers' case, "that the West Virginia coke fields are comparatively speaking, an unimportant factor in the transportation of coke to the west, although the rates from the West Virginia fields are on a parity with those from Connellsville." The commission had given data preceding this statement to show that between 1904 and 1911, the movement from Connellsville increased 31.4 per cent and the West Virginia movement only 10.4 per cent. On the Baltimore & Ohio 94.2 per cent of its westbound coke tonnage from Connellsville and from West Virginia moves from Connellsville.

This point is brought out by the commission also:

"There is no competition of importance as between Connellsville and the Fairmont district to Pittsburgh and the valleys (Mahoning, O., and Shenango, Pa.) inasmuch as Connellsville has the lower rates into these sections. The intervener ships 99 per cent of its coke to the west, principally to Steubenville, Cleveland and Youngstown. But even as to those cities, the competition with Connellsville is said to be met by underselling and by taking a profit less than Connellsville secures. Three other coke companies in the Fairmont region sell practically all of their coke in the east, largely on acount of personal friendship and acquaintance."

The existing relationship in rates to the east as between the Fairmont district and Connellsville region has been in effect as far back as any witness in the Coke Producers' case could remember.

Figures are not on hand to show the amount of tonnage which will be involved in these voluntary reductions from both the Fairmont and Connellsville regions. But in 1911 there was a movement of 1,178,966 tons from Connellsville to Wheeling.

HEAVY TONNAGE

Of Steel Required For New Battleship Besides Armor Plate.

Bids will be received by the navy department at Washington, Aug. 5, for the construction material for the giant dreadnaught No. 29, which is to be built at the Brooklyn navy yard. In addition to the armor plate, about 14,000 tons of plain rolled steel will be required. This includes 6,400 tons of standard plates, 4,300 tons of special treatment plates and 3,250 tons of structural shapes and bars.

Form New Pulley Works

The Oneida Wood Pulley Co., Oneida, N. Y., was recently organized for the purpose of manufacturing wood split pulleys. A large factory building of mill construction will be erected at once, plans and specifications having already been completed. The plant and equipment will be strictly modern and every facility will be provided for economical manufacture. A new pulley of the popular design and type will be manufactured, and it is intended that distribution shall be obtained through leading dealers in the mill supply trade. The Oneida Steel Pulley Co. of the same city will own a substantial interest in the corporation and its product will be largely marketed by this company in connection with its own makes of steel pulleys and shafting appurtenances. Frank W. Farnam, who for 23 years was connected with the Oneida plant of the National Casket Co., will be manager. The company expects to be in the market with its wood pulley about the first of November.

LARGE PURCHASE

Of Pig Iron Made by Youngstown Sheet & Tube Co.

Convinced that the "market has reached bottom", the Youngstown Sheet & Tube Co., Youngstown, O., has made the largest purchase of pig iron recorded since February, 1910.

The company has bought a total of 75,000 tons, about half of which is Bessemer and the other half basic pig iron. The iron will all come from Mahoning valley stacks, the Shenango valley makers being unwilling to meet the price plus the freight rate which the Mahoning valley furnaces are more favorably situated to make in this instance.

The iron is to be delivered over the remainder of this year and will cover the requirements of the Youngstown Sheet & Tube Co. to Jan. 1, 1914.

The price paid for the Bessemer iron was around $15.65, delivered at the works of the purchaser. The basic iron brought $14.40, this price being also for delivery at the works of the company.

"We became convinced that the pig iron market has finally reached bottom," said President J. A. Campbell, of the Youngstown company, to THE IRON TRADE REVIEW, July 29, when asked to confirm the reported size of the transaction. "This being the case and our company needing the iron, there was only one thing to do and that was to make the purchase. This has now been accomplished after several days negotiations."

The Sheet & Tube company is now melting at the rate of 3,000 tons of pig iron daily. Its new blast furnace, the fourth in the Sheet & Tube group, is having the finishing touches put to it and will be ready to light about Sept. 1.

The last large purchase of pig iron made by the Youngstown Sheet & Tube Co. involved 25,000 tons of Bessemer from the Ohio Iron & Steel Co., with a blast furnace at Lowellville, O., the middle of last December when the price paid was around $14.25, furnace, for delivery in January and February. The largest Bessemer sale before last December's transactions was made by the Steel Corporation in February, 1910, when it bought 40,000 tons at $18, valley.

Will Equip Plants.—The United States Factory Equipment Co., 133 West Thirtieth street, New York City, was recently incorporated with a capital of $10,000 to equip completely plants with power, shafting, hangers, pulleys, machinery, lighting, etc. The company contracts to do the work in fitting out a plant in this manner which frequently is done by a number of different companies. H. W. Stevenson is president.

LARGEST EARNINGS

By the Steel Corporation in Six Years—Quarterly Report.

The largest total of earnings since the second quarter of 1907 was realized by the United States Steel Corporation during the second quarter of the present year ending June 30. The financial report for the second quarter issued at New York Tuesday, shows total earnings of $41,219,813, an increase of $6,793,612 over the first quarter of 1913. In only three quarters in the Corporation's history were larger total earnings shown than in the quarter just closed. These were the second quarter of 1907 with $43,503,705, the highwater mark of earnings; the third quarter of 1907, with $43,804,285, and the fourth quarter of 1906, with $41,750,126.

EARNINGS

	Earnings before charging Interest	Less: Interest Subsidiary Co.s' Bonds	Balance
Apr., 1913,	$13,912,234	$ 839,524	$13,072,710
May, 1913,	15,386,193	831,627	14,554,566
June, 1913,	14,423,206	830,669	13,592,537
	$43,721,633	$2,501,820	
Total Earnings			$41,219,813
Less, Sinking Funds on Bonds of Subsidiary Companies and Depreciation and Extraordinary Replacement Funds		$7,629,786	
Sinking Funds on U. S. Steel Corporation Bonds		1,669,416	
			9,299,202
Net Income			$31,920,611
Interest U. S. Steel Corporation Bonds			5,642,546
Balance			$26,278,065
Dividends, Preferred		$6,304,919	
Common		6,353,781	
			12,658,700
Surplus for quarter			$13,619,365

The regular quarterly dividend was declared, the preferred of 1¾ per cent, payable August 30, and the common of 1¼ per cent, payable Sept. 29.

The total earnings of the Steel Corporation by quarters since 1909 has been as follows:

First quarter, 1913	$34,426,801
Last quarter, 1912	35,185,557
Third quarter, 1912	30,063,512
Second quarter, 1912	25,102,265
First quarter, 1912	17,826,973
Fourth quarter, 1911	23,105,115
Third quarter, 1911	29,522,725
Second quarter, 1911	28,108,520
First quarter, 1911	23,519,203
Fourth quarter, 1910	25,990,978
Third quarter, 1910	37,365,187
Second quarter, 1910	40,170,960
First quarter, 1910	37,616,876

PLACES CONTRACTS

Bethlehem Steel Co. Gives Orders For Mill Equipment.

Many contracts for driving equipment for merchant mills for the extension of the Lehigh steel works, have been placed by the Bethlehem Steel Co., South Bethlehem, Pa.

The Westinghouse Electric & Mfg. Co. has been awarded the contract to furnish the drive for the 35-inch reversing blooming mill. The order for this mill and tables went to Mackintosh, Hemphill & Co., Pittsburgh.

The drive will include two main mill motors in series, each motor designed for 600 volts direct current. It also includes a motor generator set consisting of one motor, two generators and a flywheel. The motor is to take current at 6,600 volts alternating current from the power station. The two direct current generators will also be in series of 600 volts each. This set complete is guaranteed to run the reversing blooming mill continuously rolling the maximum tonnage possible of 4 x 4 inch and 8 x 8 inch blooms, and to reverse in two seconds. It is expected it will exceed this time record. The contract with the Westinghouse company also includes all the controlling apparatus and switchboard equipment. The entire set is arranged on the Ilgner system.

A contract has also been entered into with the General Electric Co. for 12 motors to drive the following mills:

22-inch merchant mill,
16-inch roughing merchant mill,
12-inch finishing merchant mill,
12-inch roughing merchant mill,
8-inch finishing merchant mill,
10-inch merchant mill,
21-inch puddle mill,
12-inch merchant mill,
16-inch roughing crucible mill,
12-inch finishing crucible mill,
12-inch roughing crucible mill,
9-inch finishing crucible mill,

These motors range from 350 horsepower to 1,800 horsepower, some of them being direct connected to the mills, and in several cases connected through a train of gears, because of the slow speed of the mills. The motors are designed for 6,600 volts alternating current, and all are to be used on three-high mill. Separate motors were bought for the roughing and finishing mills in every case, so that no belt or rope drive will be required. The motor equipment in every case includes full equipment.

The power for all of the mill motors is to be furnished from the company's central gas engine power house. Three additional gas engines for this power plant are being built in the company's shops from its own designs.

Pig Iron Buying Pleases Pittsburgh

Purchases by Steel Companies Have Good Effect—Improved Inquiry for Finished Materials—Coke Very Strong

BY C. F. WILLIAMS

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Pittsburgh, July 29.

Heavy buying of pig iron, slightly improved inquiry for finished iron and steel products with some new buying and the victory of coke producers in selling August fuel at the prevailing price, characterize the markets in this district. Nearly 100,000 tons of steel-making pig iron have been sold the last four days for delivery the remainder of the year, and conditions are more active than at any time this year. Plates, shapes and bars are in better demand, and prices are firm. Sheets and wire, on the other hand, continue quiet and prices are weak.

Pig Iron.—The Youngstown Sheet & Tube Co. has bought 75,000 tons of basic and Bessemer for shipment the rest of the year at $14.40 and $15.65, respectively, delivered. The Jones & Laughlin Steel Co. has obtained 5,000 tons of prompt basic at about $14.25 and the American Steel Foundries has closed for 1,500 tons of prompt basic at the same figure. The Westinghouse Machine Co. has bought No. 2 and No. 3 grades of foundry for shipment the last four or five months of the year at the current market price. The Commonwealth Steel Co., St. Louis, is negotiating for 5,000 tons of basic and it appears as if rather heavy buying will continue the remainder of the year. Heavy buying at this time is believed to indicate that prices have reached rock bottom and dealers expect to enjoy improved conditions shortly.

Ferro-Alloys.—Interest manifested by dealers in recent inquiries has led some consumers to believe prevailing prices of ferro-manganese for prompt delivery could be shaded. No sales of importance have been made in this district this week.

Plates and Shapes.—Deliveries are improving steadily and some mills have not more than orders enough to keep mills operating a couple of months. There appears to be more tendency on the part of buyers, however, to cover future needs and a general buying movement is expected within the next 60 days.

Sheets.—Minimum quotations are becoming more general, and represent the market on current business, although the American Sheet & Tin Plate Co. has not officially withdrawn its prices. Many mills are openly quoting 3.30c and 2.25c for No. 28 gage galvanized and black sheets, respectively, and blue annealed products have sold at 1.65c. The leading interest is well protected with orders, and it is driving mills exceptionally hard for this season of the year; many of the independent companies, however, are in a position to make quick delivery at low figures. It is generally believed former maximum figures will be asked when the buying movement begins.

Rails and Track Material.—Demand for light rails continues good and is unusually heavy for this season of the year. A large number of inquiries for standard sections are before the trade, but do not involve heavy tonnage. No change is noted in spikes or other track fastenings.

Billets and Sheet Bars.—A number of small consumers are inquiring for billets, which are quoted at $26 to $27, mill. Sales of sheet bars clearly indicate that the market has been established at $27.50, mill, at which figure practically all the second half tonnage has been sold. Additional open-hearth steel capacity has not affected the market thus far.

Hoops and Bands.—No new developments are noted this week. The prevailing price of hoops is considered weak, although there has not been enough tonnage sold recently to test the market.

Iron and Steel Bars.—Some of the smaller mills are rapidly catching up in deliveries, but no price weakness has occurred. Leading makers of shafting are quoting 60 per cent off, but 62 per cent has been done in a number of isolated cases, and 63 off is reported in some cases, but makers say conditions are stronger today than a week ago.

Muck Bar.—One of the smaller mills manufacturing muck bar has signed the United Sons of Vulcan scale calling for $7 a ton, but the larger mills have not yet consented to the new rate and are not attempting to operate plants. Muck bar is nominally quoted at $31, Pittsburgh.

Bolts, Nuts and Rivets.—Two cents and 2.10c are the prevailing prices of structural and boiler rivets, respectively, or $2 a ton less than the previous quotations. Makers disagree regarding the prevailing price of nuts and bolts and it is understood that discounts considerably lower than those prevailing have been offered in several instances. The bulk of the tonnage, however, is commanding full price.

Iron and Steel Pipe.—An Ohio pipe maker has taken an order for 200 miles of 12-inch pipe for the Louisville Gas Line and orders for 150 miles, from 8-inch to 18-inch in diameter, have been placed with several makers in this district. Discounts are being well maintained.

Boiler Tubes.—Makers say specifications against contracts continue heavy and fairly good new demand is reported.

Tin Plate.—Specifications continue brisk and heavy shipments are being made to consumers in all parts of the country. So far as can be learned, the prevailing $3.60 base price is being maintained, although talk of concessions is heard in some quarters.

Wire.—No official change in the price of wire has been made by the American Steel & Wire Co., but many believe maximum prices gradually will disappear. The $1.70 base price for nails is more general and practically every manufacturer has sold at that figure.

Wire Rods.—Bessemer and open hearth wire rods are obtainable at a range from $28 to $29, Pittsburgh.

Coke.—In selling coke for delivery after Aug. 1 at $2.50, ovens, dealers have gained another victory. Considerable tonnage has been sold for August delivery. Some transactions call for delivery during August and September and it is understood that some coke has been sold for shipment this year at the prevailing price. The Inland Steel Co. has bought 60,000 tons of by-product coke at Chicago at less than $2.25, Connellsville ovens, for shipment until Nov. 1, when its own by-product plant will commence operations. Foundry fuel is quiet and unchanged in price.

The Connellsville *Courier* says production was 399,704 tons the week ending July 19, an increase of 9,270 tons over the preceding week.

Iron and Steel Scrap.—Heavy melting steel is selling at $12.50, although some tonnage has been sold at $12.75. Dealers appear to be more optimistic, but the market has not yet shown much improvement.

Ralph H. Sweetzer, who was recently elected president of the Thomas Iron Co., Hokendauqua, Pa., assumes his new position on Aug. 1.

Pig Iron Buying Continues at Chicago

Large Tonnage for Moline District—Gradual Increase in Demand for Finished Products Expected

BY H. COLE ESTEP

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Chicago, July 29.

Leading steel makers in the west believe that buying has reached its low ebb and that there will be a gradual increase in the volume of business as the year advances. On the other hand, it is admitted that possibly the minimum prices have not been reached on all products. This reservation refers to the well known weakness in sheets and wire. Prices of the heavier finished materials are very firm with no indication of a recession. The noteworthy increase in the tonnage of fabricating contracts let in the west recently is taken in some quarters to be a forerunner of a gradual buying movement. Prices on all important products remain unchanged with the exception of sheets. The reduction in store prices on this commodity is not expected to have any immediate effect on mill quotations. The Chicago scrap market remains sluggish.

Pig Iron.—Although by no means as feverish as was the case two or three weeks ago, the buying movement in pig iron has not disappeared. It is apparent from the purchases made last week, that there are still plenty of consumers whose needs for the remainder of the year remain wholly or partially uncovered. It is still possible to pick up odd lots of southern iron for prompt shipment at $14.85, Chicago, but for delivery including the last quarter, $10.75, Birmingham, is the best that can be done on standard grades. The demand for high silicon iron is a little livelier. There is no evidence of further sales of northern No. 2 foundry at less than $15.00, Chicago furnace. Some conception of the amount of business transacted in the west recently may be gained from the fact that reliable estimates place the volume of sales to consumers in the Moline district during the past two weeks at not less than 40,000 tons. A prominent Milwaukee malleable foundry has purchased 5,000 tons of malleable for last quarter shipment from a Milwaukee furnace, at a price said to be a shade under $15.00, delivered. It is doubtful if this figure could be duplicated at present. The Red Jacket Co., Davenport, Ia., has purchased a round tonnage of southern iron. The Link Belt Co., Chicago, is inquiring for 1,000 tons of malleable. In the south the number of furnaces willing to quote under $11.00, Birmingham, is steadily diminishing and the Woodward Iron Co. is one of the latest producers to withdraw its low prices.

Merchant Bars.—Some of the larger agricultural implement manufacturers who have been holding off on their purchases of steel bars for shipment up to July, 1914, are now in the market and will undoubtedly close for their requirements within a very short time. Among these are several concerns in the vicinity of Moline, Ill., and the International Harvester Co. The latter expects to purchase about 80,000 tons. Deere & Co., Moline, have closed for their requirements and have placed 25,000 tons with the Illinois Steel Co. Orders for the smaller sizes of wrought iron bars are plentiful, but there is very little buying of larger shapes such as are usually purchased by railroad and car building companies. The rerolling mills are actively seeking reinforcing business at present.

Plates and Structurals.—With a liberal tonnage of specifications, the makers find themselves in a comfortable position, although new business continues light. Sentiment, however, in the heavy steel trade shows considerable improvement and the larger manufacturers believe that buying will gradually increase toward the close of the year.

Rails and Track Fastenings.—Remembering the difficulty in obtaining prompt deliveries last spring, one of the large western lines has asked a local steel company to make a reservation covering its requirements of standard rails for 1914. Liberal specifications for track fastenings accompanied usually by requests for immediate shipment indicate that the railroads have comparatively little material on hand to take care of their current maintenance requirements. Light rails are somewhat weak, owing to competition from the rerolling mills.

Bolts, Nuts and Rivets.—Several of the important agricultural interests have closed contracts for their bolt, nut and rivet requirements for the coming year. This has given a better tone to the market, although quotations remain irregular. It is not expected that there will be much heavy buying during the rest of the summer.

Sheets.—The mill situation is practically unchanged. Most of the makers are in a position to take on considerable tonnage and price concessions are being made. Store prices have been reduced from $2 to $3 per ton. The heaviest cut was made on No. 28 galvanized sheets, which were lowered from 4.15c to 4.00c.

Wire Products. — The American Steel & Wire Co. has not changed its regular schedule of prices, although the pressure is heavy. The independents seem to be willing to accept less than official quotations whenever they wish to take on additional tonnage. Jobbers are buying very conservatively and, of course, the demand for fencing and other agricultural wire is at a minimum at this season of the year.

Cast Iron Pipe.—Thomas Iglehart, a Chicago contractor, is low bidder on a tonnage of water pipe at Springfield, O., although no formal award has been made. The city of Chicago opened bids July 30 on 1,050 tons of water pipe. Lincoln, Neb., will receive quotations Aug. 1 on 275 tons and Columbus, Neb., is in the market for 500 tons. Prices are a trifle steadier owing to the improvement in the pig iron market.

Merchant Pipe and Tubes.—Common pipe is in good demand and official discounts are being well maintained. Western tube mills seem to be in a fairly comfortable position. They are not able to make early deliveries and prices are firm.

Old Material.—There has been considerable activity on the part of dealers, but the attitude of consumers is practically unchanged. Some of the larger wrought iron mills in this territory are well covered, one concern being long over 12,000 tons. Actual prices remain practically unchanged, and it is not expected at present that the dealers' flurry will have any permanent effect. The Chicago, Burlington & Quincy opened bids July 30 on 1,500 tons of miscellaneous scrap, including 102 tons of axles and 200 tons of No. 1 cast. The Michigan Central will sell 1,400 tons this week, including 195 tons of No. 1 steel rails. The Rock Island is offering 2,400 tons, including 400 tons of No. 1 wrought.

Still Undecided.—The Franklin Steel Co., Franklin, Pa., a large part of whose plant was destroyed by fire several months ago, has not decided upon its new location. Several cities have made propositions to the company.

Pig Iron Stronger in Cleveland Market

Large Purchases Have Stimulating Effect—Quotations Are Advanced — Nuts and Bolts Active

BY GEORGE SMART

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Penton Bldg.,
Cleveland, July 29.

Iron Ore.—The month just closing will probably show the greatest movement of iron ore from the Lake Superior region in the history of the lakes. There were some delays on account of rain and fogs, but recently the boats have been moving at a lively clip. Vessel owners who have contract ore are particularly up on their schedules and there is no demand for wild tonnage at present. Railroads endeavoring to establish a dock charge of five cents at Escanaba, Marquette and Ashland have been allowed until Sept. 1 to submit additional data and the case then will go to the Interstate Commerce Commission. Shippers will not submit any further evidence.

Pig Iron.—The news of the purchase of 75,000 tons of steel-making pig iron by the Youngstown Sheet & Tube Co. was received with keen interest in Cleveland, where the opinion was expressed on all sides that the taking of this large tonnage from the market at the present time would have a decidedly beneficial effect on conditions, which were already improved. Even before this sale was made, the pig iron situation in Cleveland had shown decided improvement and the Cleveland Furnace Co. had advanced its quotations for last half delivery to $15, delivered Cleveland, or $14.75, furnace, for Cleveland delivery or for delivery outside of the city for No. 2 foundry. The company is so well sold up that it is not at all anxious to take on additional tonnage at the present time. Corrigan, McKinney & Co. are reported to be the low sellers, having made as low as $13.75, furnace, recently, but it is believed that they will also advance their prices. The price at Toledo has been advanced 25 cents, to $14.25, furnace, for No. 2 and the situation in that section is much more favorable. On the whole, the outlook is decidedly encouraging.

Coke.—Coke producers are standing as firm as a rock at $2.50 for furnace fuel and considerable buying for early requirements is being done at that figure. Foundries are contracting freely for foundry coke at $3 to $3.10.

Finished Material.—The leading interest reports heavy specifications, but some of the independent companies state that specifications are light. Deliveries have been made very rapidly of late and accumulations of some consumers are large. Wire nails continue weak, but the American Steel & Wire Co. still refuses openly to announce a reduction in quotations. Shafting is weak, and as low as 63 off has been done, although the usual quotation is 62 off and some sales have been made at 60 off. There is a marked increase in activity in the nut and bolt market. During the past few days, agricultural implement manufacturers have made contracts for large quantities, including one for 60,000,000 nuts and bolts. Prices are unchanged. There is only a moderate demand for bar iron. The Union Rolling Mill resumed last week and the Empire will be placed in commission next Monday. Cutting in sheets is still strongly in evidence and as low as 1.65c, Pittsburgh, has been done on blue annealed, which, until very recently, was stronger than black or galvanized.

Old Materials. — Nothing occurred during the past week to break the monotonous dullness which has enveloped the scrap market for some time past. Although an improvement in sentiment generally is reported in this as in other centers, business has been so slack and sales so few that no changes can be made in quotations. Machine shop turnings are slightly stronger, now being quoted $4.50 per net ton. It is reported that the embargo at the plant of the Upson Nut Co. will not be lifted next week, as was rumored.

Meeting of Electrochemical Society

The 24th general meeting of the American Electrochemical Society will be held in Denver, Sept. 9, 10 and 11. A special train will take the eastern members to Denver, arriving in that city Monday afternoon, Sept. 8. Sept. 9, the morning session will be devoted to the discussion of papers. Various visits have been arranged for the afternoon, with an informal smoker in the evening. Wednesday, the session will be held at Boulder, at the University of Colorado. The Boulder canyon will be visited in the afternoon. Thursday, the session will be held at the School of Mines, in Golden. Friday morning, the return trip will be begun, going first to Colorado Springs, where the Garden of the Gods will be visited. In the afternoon, a trip will be made up Pike's Peak, where the concluding session will be held. Saturday night the special train will start from Colorado Springs on the return trip to the east. All requests for Pullman car reservations and railroad transportation should be made to the chairman of the transportation committee, J. H. Muir, 239 West Thirty-ninth street, New York City.

PRICES FIRM

In St. Louis—Low Quotations Have Disappeared.

BY E. C. ERWIN

Office of THE IRON TRADE REVIEW,
St. Louis, July 29.

Pig Iron.—There is virtually no pig iron inquiry in the St. Louis territory, but prices are stiff at $11, Birmingham, for southern No. 2, and dealers are hopeful that low prices have disappeared not to return for quite a while. Sales the latter part of last week consisted of 500 tons of charcoal iron to the Mount Vernon Car Co., Mt. Vernon, Ill.; 175 tons of charcoal iron to the J. C. Kufferle Foundry Co., of St. Louis; 350 tons of Clifton, 100 tons of Sloss and 400 tons of Woodward iron to the Medart Patent Pulley Co., St. Louis; 500 tons of ferro-manganese to the Colorado Fuel & Iron Co. for August and October delivery.

The Alton Steel Co. also bought 2,000 tons of blooms and is in the market for 2,000 tons of billets.

Northern iron is quoted at $15, Chicago furnace, and $14.50 to $15, f. o. b. Ironton.

Coke.—The market for coke is quite dull, with prices ruling at $2.75 to $3 for Connellsville and Virginia foundry for prompt shipment and at $3 on contracts for the year.

Old Material.—Local scrap dealers believe that weather conditions are a sure indication of a serious car shortage and consequent rise in scrap prices and are making strong efforts to cover on all old orders. Prices have not changed so far, however, and there are no important lists out this week. Some good business is expected next week.

Geo. B. Norcross & Co., 1030 Engineers' building, Cleveland, will act as western representative for the Reohling Electro Steel Co., 173-77 Lafayette street, New York City.

Moderate Improvement in the East

Prices Stronger in Nearly All Lines—New Business Does Not Make Large Volume

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
611 Bulletin Bldg.,
Philadelphia, July 29.

The drift of sentiment towards a more favorable position slowly continues in the eastern Pennsylvania iron and steel market. Tangible results from this development are still not very marked in new business, however. There is fair activity in pig iron and finished materials, the same as for some weeks. Prices, with few exceptions, show more strength in all lines, indicating where long declines have occurred that the limit has been practically reached.

Pig Iron.—The better undertone to the pig iron market has been productive of only moderate effect in the tonnage changing hands in the eastern Pennsylvania district up to this time. Inquiry is being put out more freely, but apparently the situation will require further improvement before a sizable buying movement for forward delivery will develop. Eastern Pennsylvania makers more uniformly are combating further price concessions, but Virginia conditions are irregular. The Virginia Iron, Coal & Coke Co. is holding to a schedule of $13, furnace, for No. 2X, $12.75 for No. 2 plain and $12.50 for No. 3 and lower grades. This is equivalent to $15.80 for No. 2X in the Philadelphia market. Another Virginia maker has been offering iron at $12.50, furnace, for No. 2X, or $15.30, delivered this district, though only on small trial orders, and there are other evidences of softness. The National Radiator Co. bought 3,000 tons of No. 2 plain for last half at $15.50, delivered, which it is reported will come from Virginia at $12.50, furnace. A pipe maker in the district took 3,000 tons of low grade iron. Pipe iron and mill forge are quotable at $14.50 to $15, delivered. One mill took 500 tons. Northern No. 2X remains $15.50 to $15.75, delivered in this district. There are indications of considerable quiet buying. No new basic inquiry has come out, but one or two consumers are expected shortly in the market for fourth quarter. Prices are uncertain. The Trenton Malleable Iron Co. bought 500 tons of malleable at $14, Buffalo, or $16.45, delivered, and asks 500 tons additional for forward delivery. The low phosphorus market is quiet. Prices are unchanged.

Iron and Steel Bars.—There is some contracting of a miscellaneous character in steel bars for last half delivery at 1.40c, Pittsburgh. One or two larger tonnages are pending. Specifications are fair and deliveries closer. Prompt bars for mills are selling at 1.85c, Philadelphia. Considerable irregularity marks the bar iron market. The larger eastern makers ask 1.40c, mill, but this level is being sharply shaded by some makers of common bars. Business is moderate.

Plates.—Some eastern Pennsylvania plate makers have continued to enter new business in excess of record shipments. One maker booked 2,000 tons, or practically one-third over its rated capacity, last week. Other eastern mills are not doing so well and have some difficulty to maintain full operations. New business is usually in small orders. Deliveries are very prompt. Eastern plates hold firm to 1.65c, Philadelphia. A lot of 5,000 tons of steel skelp for export is up.

Structural Material.—A slight improvement is noted in the structural market. New business and specifications have increased somewhat. Some companies in July entered more tonnage than in June. Shipments average about four weeks in the large and eight weeks in the smallest sizes. Occasional reports still arise of concessions from 1.60c, Philadelphia, being made by eastern makers, but these are not confirmed.

Sheets.—One leading eastern maker rolling especially the heavy gages reports the largest tonnage in history upon its books. New business is good and specifications active. Orders are readily obtained on the basis of 1.90c, Philadelphia, for No. 10 gage.

Semi-Finished Steel.—A fair amount of new billet business is moving and contracts are being steadily drawn against. The National Tube Co. recently placed 4,000 tons additional of special open-hearth billets with an eastern Pennsylvania maker. A sale of 500 tons of open-hearts slabs is noted. Prices remain as quoted.

Old Material.—There is somewhat of a dead balance in the scrap market. Merchants are not anxious to sell nor consumers to buy. Sales continue to be confined to such material as holders are forced to move. Sentiment apparently is improving and there are many expressions that the market is at bottom. Prices hold more evenly.

BUFFALO PRICES

Are Somewhat Higher on Pig Iron—Good Tonnage Sold.

BY FRANK R. DOLBEE

Office of THE IRON TRADE REVIEW,
Buffalo, July 29.

Pig Iron.—A rebound from bedrock characterizes the pig iron market situation in this district. The range which sagged to $13.50 to $14 a week ago, and was then indicated as the bottom level, has recovered to a schedule for all grades, of $13.75 to $14.50. The furnaces report a little stronger general feeling, indicated by an increase in activity on the part of a great many of the melters of the territory, who came into the market during the week for a placement that amounted to between 25,000 and 30,000 tons. These sales were divided about equally between malleable and foundry grades, the latter being mostly No. 2X; No. 2 plain and No. 3 foundry sold at from $13.50 to $14, for delivery over the remainder of the year, but a great deal of the placement was for immediate delivery. This was occasioned by consumers who have waited so long before booking their orders that they found themselves confronted with the necessity of getting iron at once from the producers or the closing down of their foundries through lack of stock on hand to go ahead. A sale of 6,000 tons of malleable was made at $14. Furnaces are not taking on tonnages for delivery after the first of the next year, on the theory that 1914 will be in advance of the level prevailing. Some interests are not quoting anything at less than $14.

Finished Material.—In keeping with the improvement noted in the iron market the mills and agencies of the district report a better tone reflected in the inquiries and orders booked over the past week or 10 days. While the buying is not extensive, it is said to be more general than it has been for some weeks. A number of the mills of the district report that the indications are in favor of a larger buying movement to materialize in the near future. Prices remain absolutely rigid, as they have over a long period, on bars, shapes and plates. None of the producers report any cancellations being made, and while the mid-sum-

mer season is marked by the absence of new construction placements, the fabricators are all working full time in getting out the large tonnages for earlier in the season.

Old Material.—A better feeling is reported by the dealers all along the line. This improvement is said to be noticeable in practically all of the materials, and particularly so in borings, the activity in this commodity leading. While the swing has been towards a better tone, it has not caused any changes in the prices quoted a week ago. Dealers are not seeking to place much business on the present base, and the consumers on the other hand are making purchases in small tonnages, in an effort to keep from stiffening the market. The disposition of the yardmen is to look for an improvement in their lines in keeping with the change for the better noted in pig iron.

Tonnage of Basic Bought at Cincinnati

Includes Both Southern Ohio and Northern Ohio Grades—Prices More Firmly Adhered to in the South

BY S. G. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, July 29.

Pig Iron.—The general market is very quiet, but prices in both the south and southern Ohio are holding fairly well. Southern quotations especially show a tendency to advance, while southern Ohio furnaces have recently repeatedy refused to quote below the minimum price on several attractive tonnages. Transactions and inquiries in both districts are very few, and usually for small tonnages. A local melter, however, has taken from 10,000 to 20,000 tons of basic iron for shipment over this year and extending into next year, the purchase having included both southern Ohio and northern Ohio iron. There are also several prospective inquiries, such as 3,000 tons of malleable iron from central Indiana, 5,000 tons of basic iron from southern Ohio, and 3,000 tons of foundry iron from Dayton, O. The demand for malleable iron appears to be rather good at the present time considering the general dullness of the market.

Southern quotations range from $10.50 to $11, Birmingham basis, for strictly No. 2 foundry iron for any delivery this year, which prices include both Tennessee and Alabama makes. There are probably more furnaces quoting $11 than $10.50, but more is being sold at the lower price than at the higher. One Alabama furnace is openly soliciting business at $10.50, Birmingham, although it has booked a rather heavy tonnage within the past 30 days.

In southern Ohio, the minimum price for No. 2 foundry iron is $14, Ironton, for any delivery this year, but this price is only being openly offered by one interest. The rest are asking $14.50, Ironton, as their lowest figure. Plenty of iron, however, can be had at $14. Furnaces in this district have repeatedly been offered attractive orders within the past week at $13.75, Ironton, but these have all been refused up to the present time. It is not definitely known whether or not there is any more resale iron to be had from this district, but it is probable that not much is available.

Eight per cent silicon iron is quoted a little lower, being now from $17 to $17.50, furnace.

Coke.—The coke market is strong. A general advance has taken place within the past week on both furnace and foundry grades in the Pocahontas and New River districts and on 72-hour brands in the Connellsville and Wise county fields. Pocahontas foundry coke is now quoted at $3 per ton, ovens, for any shipment this year and furnace coke at from $2.60 to $2.75, ovens, for both contract and spot shipment. There is probably no Connellsville foundry coke to be had below $3 per ton ovens and furnace coke is holding at $2.50 per ton, ovens. The minimum price in the Wise county fields for foundry coke is $2.75, ovens. There is a decided scarcity of coke in Pocahontas and New River districts and this is also the case to a certain extent in the Wise county fields, all of which has been brought about by poor labor conditions within the past two or three weeks. Sales of either furnace or foundry coke have been rather light recently in Cincinnati. This is due to a large extent to the fact that the present iron molders' strike has closed practically all the foundries in this city.

Finished Material.—Sheets appear a little weaker and the local mill has reduced its prices to 3.30c for galvanized sheets No. 28 gage and 2.25c for black sheets No. 28 gage, Pittsburgh basis, for immediate specifications only. Specifications, however, continue very good and the outlook for a good business, especially in August, is very encouraging. Very few contracts are being made for other finished materials, but specifications are good as a general rule in all lines.

Warehouse prices are unchanged and fairly firm. Business, however, is not so good, and some of the local houses have been making concessions on special contracts. Sales have fallen off a little within the past week, but very few cancellations of contracts have taken place.

Old Material.—The scrap market is still in a very unsettled state. It could hardly be said that there is a definite level of prices, as nothing has occurred recently upon which such a statement could be based. The few sales that are being made do not adhere in any way to general market quotations and prices concerning them depend altogether upon the conditions of the transactions. The supply is far in excess of the demand and this latter has been further lessened recently by the molders' strike which has incapacitated practically every foundry in the city. The rolling mills also in this territory seem to be well supplied for the time being. Sales during the past week have centered around bundled sheet scrap, No. 1 busheling and mixed cast.

Demand for By-Product Coke

Birmingham, Ala., July 29.—The demand for steam coal is hardly sufficient to warrant the desired output at all mine operations; however, the tonnage required is liberally distributed among the various operators, and as a result, serious reductions in price have not been made for any grades. The output of bee-hive coke has decreased with the smaller furnace consumption, but a market has been found for the by-product output, and such ovens are being operated to capacity. In this connection the purchase of 20,000 tons of by-product coke by a southern gas plant for water-gas making, which is just announced, is very interesting. The tonnage referred to will be furnished from the Fairfield ovens of the Tennessee Coal, Iron & Railroad Co.

Puddlers Get Advance.—The Reading Iron Co., Reading, Pa., has granted its puddlers an increase of from $4.75 to $5 per ton and has assured the men of a further advance when trade conditions warrant. The men have accepted the increase but it is reported will become affiliated with the American Federation of Labor.

Pig Iron Prices Firmer in New York

Sales of Past Two or Three Weeks Amount to Nearly 100,000 Tons—Buffalo Quotations Advancing

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg.,
New York, July 29.

Iron Ore.—The eastern iron ore market is practically stagnant, both in inquiry and in sales. Shipments are going forward fairly well.

Pig Iron.—Conservative estimates now place the amount of iron quietly sold in metropolitan and lower New England territory during the past two or three weeks at 75,000 to 100,000 tons. As a result of this movement, sentiment has substantially improved and prices show unmistakable signs of stiffening, especially in the Buffalo district, where the furnaces have sold heaviest. The Buffalo market is now apparently reversing itself and is tending towards a firm level of $13.75 to $14, furnace. The largest recent sales made were done at $13.50, Buffalo basis, which further discredits the reports recently current of prices 25 to 50 cents lower going in that district. The largest single purchase embraced 20,000 tons of malleable for shipment over the remainder of the year to the New England plants of the Eastern Malleable Iron Co., the so-called Malleable Syndicate. This business was equally divided between a Buffalo and another New York state furnace at $13.50, Buffalo basis. This buyer had been negotiating for weeks and had sought to close at $13, Buffalo. Other sales recently made include numerous round lots of foundry and malleable grades. Eastern Pennsylvania makers are holding more firmly to a range of $15.50 to $15.75, delivered this district, though sometimes $15.25, at close-by points, is done. Virginia iron is weak, having been quoted at $12.50, furnace, for No. 2X by some makers. Written inquiry reaches 5,000 to 6,000 tons, including 1,200 tons of foundry iron for the New York Central railroad for Frankfort, N. Y., 1,600 tons for an Irvington, N. Y., consumer, and other lots of 1,200 tons, 600 tons and smaller lots. A lot of 5,000 tons of basic for a Phillipsdale, R. I., buyer is still open.

Ferro-Alloys.—Consumers of ferromanganese who recently have been in the market for a total of about 3,000 tons, apparently are in no hurry to close. None of these orders have been placed. The forward market is firm at $58.50, seaboard. Prompt material can be had at about $1 less. Ferro-phosphorus, 20 per cent, is quoted at $52.50, makers' plants.

Plates.—Considerable new miscellaneous business is being taken by eastern mills, but large orders are not numerous. This condition is irregular, however, as some makers report considerably heavier bookings than others. Little new business for the mills is coming from car buying, which is very dull. Specifications are active and consumption apparently is well maintained. Eastern makers quote tank plates at 1.66c, New York, for very prompt delivery. For more extended shipment, middle western mills offer material at 1.61c, New York.

Structural Material.—More activity in the structural market is shown in apartment construction in the metropolitan district, reflecting better financial accommodations. Other classes of work, however, are below the average and the railroad tonnage is relatively light. Subway work now definitely offered represents the principal tonnage. The price situation seems to be better sentimentally, inasmuch as rumors of concessions from 1.61c, New York, or 1.45c, Pittsburgh, are fewer. Eastern mills are offering deliveries in from four to six weeks.

Iron and Steel Bars.—Specifications in steel bars during July in this district show a slight increase over June. New business is small, as most buyers are covered. Bar iron remains weak and irregular. Local mills quote 1.25c to 1.30c, mill, and eastern makers, 1.35c to 1.40c, mill.

Cast Iron Pipe.—R. D. Wood & Co. have been awarded about 10,000 tons of pipe and specials for the extension of the New York high pressure system by the general contractors, the Degnon Construction Co. This same maker has taken 1,275 tons of 24-inch for Schenectady, N. Y., at $19.90, delivered. New business is fair, but many shops would welcome more tonnage than the heavy sizes. Financial difficulties apparently still deter public lettings. Eastern cast iron pipe makers show considerable concern over the proposal by the senate to place their product upon the free list after the house tariff bill had given it 15 per cent protection.

Old Material.—Merchants in old material report a light volume of trading in this territory. Supply and demand seem well balanced and middlemen find difficulty in either buying or selling. Prices are fluctuating more narrowly.

Prices Advancing at Birmingham

With Good Tonnage of Sales—General Withdrawal of Old Quotations—Call for Prompt Iron Improves

BY W. B. NEAL

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., July29.

Pig Iron.—With an aggregate of some 35,000 tons, including the 20,000 tons mentioned for export, entered on order-books during the past week, the general condition of the local market is no doubt materially improved. Quotations on a basis of $10.50 per ton, Birmingham, are no longer heard of for any delivery, and where a basis of $10.75 per ton at Birmingham is reported, the period for delivery is limited to the remainder of the third quarter in the majority of cases. Fourth quarter deliveries are quoted at $11 per ton, Birmingham, by all of the several producing interests, and notwithstanding the inquiry recently made, a basis for quotations on deliveries in the first quarter of next year has not been decided upon. It is noted that all local brands are quotable in northern and eastern markets at practically the same figures that are being asked for southern deliveries, and that in such sections additional strength to the southern situation is usually accredited. The sales made in the past week do not involve a large tonnage for shipment into competitive territory, but in no case was a lower selling price mentioned than $10.75 per ton at Birmingham. Producing interests report tonnage entered in the week about as follows: 9,000 tons of assorted grades in lots of 250 to 750 tons each, for delivery over the remainder of the year, at a strict $11 per ton, Birmingham, basis;

2,000 tons in comparatively small quantities, for July and August shipment, at $10.75 per ton, Birmingham, for No. 2 foundry; two lots of 800 tons each, of No. 2 foundry, and a single lot of 500 tons of No. 4 foundry, all for prompt delivery, at $11 and $10.25 per ton, Birmingham, respectively, and an aggregate of 2,500 tons, for delivery over the remainder of the year, sold on an analysis basis, at $12.00 to $12.50 per ton at Birmingham.

The feature of the week was the withdrawal of quotations previously submitted, and the manifested disposition by all of the selling interests to govern commitments in the matter of price by existing local conditions. On a round lot offered a certain producer, the quotation was advanced twice within the week, and in many cases buyers found it necessary to pay 25c per ton higher than was expected for immediate requirements. The call for prompt shipment continues to improve, and of course, the forwardings from furnace yards are affected accordingly. Recent reports indicate shipments so far in the month in excess of the make at at least two furnace plants, and stocks do not appear to have increased at any other plants. It is still understood that two stacks now in blast will be blown out around Aug. 1, but in this the conditions existing at that time will probably govern.

Many Small Orders for Cast Iron Pipe

Birmingham, Ala., July 29.—The aggregate of small orders placed with local concerns in the past ten days is attractive, and the average price consideration is more satisfactory. Forwardings for the week include a round tonnage entered some weeks previous for the requirement at Santiago, Cuba, and resulted in an appreciable decrease in stock accumulations. A large volume of new business is pending the disposition of municipal bonds, but immediate prospects concern individual requirements principally. No definite announcement has been made as to the commencement of operations at the new plants at Anniston, and at Boyles, Ala., but the entire capacity is now being operated at the several local plants. Quotations are considered firmer than at the time of last report, and for certain sizes are subject to revision.

James Rafferty, master mechanic for the James P. McNichol Construction Co., died recently.

WAR ON WARRANTS

Attracting a Great Deal of Attention in England.

(Special Correspondence)

Birmingham, Eng., July 19.—Recent developments of the movement for revolutionizing the methods of selling pig iron are attracting a great amount of attention, and may have a very important bearing on the future of the iron trade. Following the recent failure of Messrs. Watson, it is proposed to abolish the present system of selling from warrant stocks. The first effect of this would be to remove the center of sale from Glasgow where it has been for many years and makers would then sell their products direct to the user. The proposal really is to create a selling agency and fixed prices. It is a little foreign to British ideas, savoring as it does somewhat of more than a suggestion of a trust, but it is supported by some of the largest Middlebrough firms, and is not unlikely to take concrete form.

The new movement originated in the heavy failure some weeks ago on the Glasgow warrant market. This was the culmination of a long period of speculation when the "bulls" and "bears" had alternate runs, and finally the firm of Watson, which for years has held a commanding position, came down.

Naturally, the movement is strongly opposed by the Glasgow brokers who for many years have made good profits out of the pig-iron stocks. The brokers, will, of course, find their occupation gone, if the pig-iron output is placed in a central manufacturing control with power to fix prices. The avowed object is to maintain a steadier market, but the fact does not escape the notice of consumers that the position would be wholly favorable to the makers, who could do what they pleased with the consumers. Already the Scottish iron founders through their association are protesting strongly against the concentration of the trade in the hands of a selling agency, and they threaten, if their protests are ignored, to safeguard themselves by buying in other markets. If this threat is carried out, a pretty stiff tussle may be looked for soon, as the iron founders declare they can fight the Cleveland ring by getting supplies from abroad. They state that they can get pig iron from France and Germany at prices sufficient to keep the selling agency in check. Outside the Scottish iron founders, consumers are apparently not much disturbed, as they place considerable reliance on the fiscal freedom which leaves British buyers free to go to the markets of the world. The reckless gambling in the past has smitten not only the maker but the consumer, by introducing an artificial condition of things, and, from this point of view, it is not at all unlikely that the proposed changes may eventually be carried through.

METAL MARKETS

Chicago

July 28.

New Metals.—Copper is stronger, due to the effect of the northern Michigan strike. Actual consumption of the red metal in this district shows practically no change. Tin is practically unchanged. Spelter is steady and sheet zinc has been advanced 25 cents per hundred pounds.

We quote dealers' selling prices f. o. b. Chicago as follows:

Lake copper, carload lots, 14¾c; casting, 14⅝c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.30c; lead, desilverized, 4.30c, sheet zinc, $7.25, f. o. b. La Salle, in car lots of 600 pound casks; pig tin, 40c; Cookson's antimony, 8¾c, other grades, 7¾c.

New York

July 29.

Copper. — Considerable buying interest has been shown in the copper metal market during the past week, resulting in advancing price ⅝c per pound, compared with 14.37½c, a week ago, for electrolytic. Three successive increases by the leading sellers, the last being announced today, has again put the metal on a 15c cash, basis in New York. Both domestic and foreign consumers participated in the buying movement; the latter it is reported having contracted for very large tonnages. The strike in the lake region has been a material help to the advancing of prices, foreshadowing a reduction in smelter output. This will not become evident in the refining output before two or three months if at all, however, still it has a substantial effect. There is also a much better general business sentiment behind the advance which gives the market a stable tone. All the leading sellers are asking 15c cash, New York, and 15.12½c, delivered, for electrolytic and 14.87½c for casting. Few sellers of lake are offering that brand, but nominal quotations range from 15.12½c to 15.25c.

The London market closed weak today at £65 15s, for both spot and futures, which is a decline of £1 10s from Monday.

Exports of copper since July 1, amount to 25,621 tons.

Tin.—The price of tin in London has been unsettled though fluctuations were not as violent or wide as last week. Both spot and futures closed at £185 10s, which is £1 15s under the closing of July 22. In the local market sellers have been able to secure a slight premium on spot and nearby metal. A fair volume of business has been done, most of which represented closing out of July contracts. Some of this metal cost buyers 48c per pound. The market closed firm today at 40.90c for spot and July, and 40.75c for August and September.

Arrivals since July 1, aggregate 4,245 tons.

Antimony.—Some improvement is noticeable in the antimony market but it is very slight. Prices are unchanged. Cookson's is 8.50c, Hallett's is 8c, and other brands from 7.25c to 7.50c.

REPUBLICANS DIVIDED

In Their Votes on the Tariff—Democrats Support the Bill.

Washington, July 29.—Discussion of the earthenware schedule of the tariff bill has been taken up in the senate, and the metal schedule, the next in order, may be reached the latter part of this week. This is subject to numerous circumstances, however. Republican senators have been scheduled ahead for addresses, and this feature will delay debate, and, further, arguments, which were sharp at intervals on the chemical schedules, are probable at any time, halting progress. One day debate on paragraphs is disposed of speedily, only to be followed the next day with slow argument.

Senator Kenyon of Iowa, a Progressive Republican, is expecting to deliver an address tomorrow afternoon on the tariff. In it he will give particular attention to a discussion of the aluminum industry and attack the Aluminum Co. of America as being a monopoly with complete control of the aluminum and bauxite of this country, as well as abroad. Mr. Kenyon has drawn up an amendment proposing to put aluminum on the free list. Senator Cummins, also of Iowa, and a Progressive Republican, told a representative of THE IRON TRADE REVIEW that he will have his metal schedule completed soon, and will offer it as a substitute for the schedule incorporated in the Democratic tariff bill. While Mr. Cummins did not indicate the nature of the duties he proposes in the schedule, it is understood they will represent a compromise between the Payne law and the Democratic bill.

The schedule of Senator Cummins, as well as those of other Progressive Republicans, will be supported by all the members of that wing of the senate. This was decided upon at a conference of the Progressives yesterday morning. It was held in the office of Senator LaFollette of Wisconsin, and followed the activity of Senator Smoot of Utah. The latter's well known ability as an exponent of high protection has been brought into play numerous times since the bill went into the senate and Progressives, by their meeting, made it known that they are going to air their views that they might go to the country as tenets distinctive from those of both the Democrats and the high protectionists. Eleven senators pledged themselves to the Progressives' program. They are: Senators LaFollette, Wisconsin; Cummins and Kenyon, Iowa; Bristow, Kansas; Clapp, Minnesota; Works, California; Crawford and Sterling, South Dakota; Borah, Idaho; Gronna, North Dakota, and Norris, Nebraska.

Senator Smoot rose to his own defense in the senate yesterday afternoon, following the reading of a letter from a resident of Rhode Island, addressed to Senator John Sharp Williams, of Mississippi, in which the writer attacks figures of Mr. Smoot which the latter used in his tariff speech recently. The Rhode Island man, unknown to Mr. Williams, or any of the other senators, said Mr. Smoot's figures stating the wages paid lead and zinc miners of Utah were incorrect, and that instead of being from $3.50 to $4.75 per day, as given by Mr. Smoot, should be $1.66 2-3 and $1.71. The writer claimed he got his authority from the United States statistics, and advocated free listing of lead and zinc. Mr. Smoot made a sharp answer, and pointed out that the writer, perhaps unacquainted with the manner of how the figures were compiled, had misconstrued them. He insisted the figures he gave were correct. Senator Williams admitted that he thought the writer was mistaken. Other apparent errors in the letter were pointed out by Mr. Smoot and Senator Townsend of Michigan, criticised Senator Williams for allowing figures to go into the record before they had been verified.

An anomalous situation has developed during the consideration of the tariff bill. Republicans have been voting solidly to retain articles on the free list, while Democrats have voted to impose a duty on them. Explaining their position, Republicans have said that the articles were necessaries of life and most of them are already on the free list. Democrats, on the other hand, have endeavored to justify their position by saying they were raising revenue for the government.

Up to the present, the Democrats have not lost a single vote, while the Republicans have seldom voted solidly on any paragraph. The latter have said repeatedly, both in private conversation and on the floor, that the measure will go through as it is now built, unless the majority of the finance committee itself determine upon changes. Some of the Democratic leaders have viewed these repeated utterances of Republicans as a bait to lead the majority to think it is safer than is really the case. Past occurrences, as well as talk in party circles, denote that the majority leaders are more or less apprehensive over their narrow margin and are making every possible attempt to prevent a revolt in their ranks which would defeat the bill.

Senator Smoot has said that the bill will be voted on in the senate between Aug. 15 and 20, a date considered entirely too early by many. Most of the senators say it is premature to say with anything like accuracy when the final vote in the senate will be taken.

BOILER MAKERS

Will Celebrate Silver Anniversary at Cleveland Convention.

The American Boiler Manufacturers' Association will hold its twenty-fifth annual convention in Cleveland, Sept. 1 to 4, inclusive, with headquarters at the Hollenden hotel.

This convention will prove of special interest to boiler and tank manufacturers and steel plate users in consequence of the proposed adoption of the standard and uniform boiler specifications, also from the fact that this convention celebrates the silver anniversary of the association.

As Cleveland is centrally located, a large attendance is expected from Canadian and United States manufacturers and allied interests.

The local committee have provided an excellent program of entertainment for the visiting ladies, and an excursion on the lake Wednesday, Sept. 3, for the members and guests.

The convention will conclude with a banquet Thursday evening, Sept. 4. All of the manufacturers and users of steel plate are invited to attend the convention, and reservations for rooms should be made at once.

Gear Company Grows

The Akron Gear & Engineering Co., Akron, O., advises that at the annual meeting of stockholders this month the capital stock of the company was increased from $20,000 to $50,000, because of the rapidly increasing business.

The company makes a specialty of cutting gears of all kinds and does a general machine shop business. Arrangements are being made to have the plant work night and day. Directors have elected the following officers:

President, J. Asa Palmer.

First vice president, W. F. Warden.

Second vice president and assistant secretary, T. A. Seacrist.

Secretary and treasurer, Otis E. Prier.

General manager, Jesse R. Triplett.

Mr. Warden is well known as the president and general manager of the Burt Mfg. Co., and Mr. Palmer as secretary and assistant general manager of the same company.

INCREASING ACTIVITY

In Structural Demand in Most Parts of the Country.

Fair activity is shown in the eastern structural market, where awards the past week reached approximately 5,000 to 6,000 tons. In New York City, apartment work is more active, but other branches of construction are comparatively quiet, excepting subway and elevated extensions, where about 20,000 tons are now before fabricators under construction contracts, either placed or advertised. The railroads are still furnishing but little tonnage.

There has been a marked improvement in the volume of fabricating contracts in the west. Over 7,300 tons were placed last week. This includes one good sized order embracing 3,600 tons and 11 small orders ranging from 100 to 900 tons.

Inquiries for structural material in the Pittsburgh district are heavier than they have been for several months, although no large projects are being undertaken locally.

STRUCTURAL STEEL AWARDS

Extensions of plant of General Electric Co., Pittsfield, Mass., 1,800 tons to Levering & Gerrigues.

Office building for Lehigh Coal Co., Wilkes Barre, Pa., 550 tons to Lackawanna Bridge Co.

Bottle factory, Havana, Cuba, 1,300 tons to the Riverside Bridge Works.

Two apartments for Paterno Bros., Broadway, between 78th and 79th streets, New York City, 1,200 tons to Passaic Structural Steel Co.

The Bethlehem Steel Co. will furnish 1,000 tons of Bethlehem sections to the Passaic Structural Steel Co. for the Levi apartment, 72nd street and West End avenue, New York City. Award of fabrication previously reported.

Commonwealth Edison Co., power house at Chicago, 3,600 tons, let to the Chicago Steel Products Co.

Prairie Oil & Gas Co., pump and gate houses, Shannondale, Mo., Centralia, Mo., Wellsville, Mo., and Moscow, Mo., 356 tons.

Minnesota Steel Co., coal storage building for coke plant, New Duluth, Minn., 500 tons, to American Bridge Co.

Sioux City, Ia., high school building, 456 tons.

Arkansas & Memphis Bridge & Terminal Co., shafting, locks, doors, etc., for Memphis bridge, 300 tons, to Southern Boiler & Tank Works, Memphis, Tenn.

Burnett Apartments, San Francisco, 300 tons, to the Ralston Iron Works.

Mills building, San Francisco, Cal., 950 tons to Levering & Garrigues.

CONTRACTS PENDING

Section No. 1 of Broadway-Fourth avenue subway extension from Fourteenth to Twenty-Sixth streets, New York City, 3,000 tons. E. E. Smith Contracting Co., low bidder.

Section No. 1 of Astoria, Woodside and Corona elevated lines in Queens, New York City, estimated to require 9,000 to 10,000 tons. Construction bids to be opened August 19.

Car barns for the British Columbia Electric Railway, Vancouver, B. C., 1,000 tons. Bids asked for the steel by the engineers, Westinghouse, Church, Kerr & Co., New York City.

Docks for Michigan Alkali Co., at Alpena, Mnch., 800 tons.

Post Office building, New Haven, Conn., 900 tons. Bids asked on steel by contractors.

Ashtabula, O., shops of the Lake Shore R. R., 1,200 tons, cost with equipment, $200,000. Bids submitted.

Art museum, Cleveland, to be erected by King Bridge Co., will have 1,500 tons of steel, of which half will be Bethlehem sections and the other half will probably be furnished by the Lackawanna Steel Co.

RAILROADS FIGURING

On Placing Large Rail Orders for Next Year's Delivery.

The most interesting development in railroad buying is the action of certain leading trunk lines in opening negotiations with the rail mills for early positions on winter schedules to insure prompt delivery next year. The New York Central system has begun figuring with makers on a position for a heavy tonnage. This system usually purchases about 150,000 tons annually. Other rail inquiries which have been pending for next year are still open. Buying of other steel products by the railroads is relatively light. Bridge work is coming out rather slowly. The New York Central lines have closed for their last half bolt requirements, aggregating several million bolts, and are now in the market for their standard spike needs. It is expected that they will close for 30,000 kegs or more.

CAR AND LOCOMOTIVE ORDERS

The Monongahela Railroad has ordered six consolidation freight locomotives from the American Locomotive Co.

RAIL SALES AND INQUIRIES

Government railways of Ecuador, 3,000 tons of tie rails. Inquiry pending.

New Orleans Railway & Light Co. and other New Orleans street railways, 3,000 tons of tee rails. Inquiry pending.

BRIDGE WORK

Metropolitan Railways Co., Brooklyn, 3,500 tons, for section of elevated railway extensions. Bids asked for August 7.

Shasta County, Cal., two 275-foot x 21-foot through highway spans, Reids Ferry, Reading, Cal., 350 tons.

Plans have been prepared for an industrial school and gymnasium to be erected by the city of Holyoke, Mass. The building will be 104 x 109 feet, three stories, with basement, and cost about $75,000.

A. F. Huston, president of the Lukens Iron & Steel Co., Coatesville, Pa., has gone to his summer home in the Catskill mountains where with his family he will spend the rest of the summer.

RUSSIAN FERRO PROBLEM

Alloy Not Made in Country Where Ore is Mined.

(Special Correspondence)

St. Petersburg, July 14.—The manganese ore business of the Caucasus has passed through a very checkered history. At one time it is thought to be hopelessly ruined; at another the exports of the mineral become so inflated as to make it look like a perfectly solid national industry. This capricious movement is largely due to freights, and as they fall or rise, the Caucasus manganese industry is prosperous or otherwise. The local problem would be largely solved could the producers make ferro-manganese. Unfortunately the fuel is lacking. It is known that there are coal measures not far away; but it may be assumed that the quality of the coal is more than doubtful; else these measures would have been exploited long ago, if for no other purpose than that indicated above. Meantime the position has largely fallen into the hands of the Germans, who know how to handle the business, and who are very large consumers of the product. The miners are a very poor class of men, and a large proportion of the production is the result of individual labor by these men. The consequence was that it was easy for energetic business men like the Germans to come down on the field and get control of it. We may be sure that if the coal deposits referred to are of any use at all, the Germans will not fail to get at them and begin the production of ferro-manganese; which is often promised, but hitherto has not taken place. As for the other manganese deposits of Russia, namely in the Nikopol district, they are of little interest to the rest of the world, because the local Russian iron works —in the Donetz basin—use them all up, and again those in the Urals are far too small in quantity to be called either of world wide or even local importance.

To Sell Conduit Pipe

The National Tube Co., Pittsburgh, advises that beginning Aug. 1 it will enter the electrical conduit field. The company has contracted with the National Metal Molding Co. and the Safety-Armorite Conduit Co., both of Pittsburgh, to make and sell the product as its agents under their various brands. It also will sell the product on the "Pittsburgh basing discount" plan in the same manner as all wrought iron pipe for the past 13 years has been sold.

GOOD FEELING

Established by Confidence in Workmen's Compensation Act.

Milwaukee, July 29.—As the result of the first conference to be held between the Wisconsin Industrial Commission, which is in charge of the administration of the workmen's compensation act, and 75 liability insurance agents of Wisconsin, a permanent organization of agents has been organized to co-operate with the commission in every way in a just and equitable execution of the statute. Up to this time, the spirit or feeling of liability insurance agents with regard to the industrial insurance act was more like antagonism than of co-operation.

The organization of agents is styled the Workmen's Compensation Association of Wisconsin Agents, and officers were elected as follows: President, Howard D. Plimpton, Milwaukee; vice presidents, John N. Manson, Wausau, and R. H. Norris, Milwaukee; secretary, H. L. Lasche, Milwaukee; treasurer, A. H. Hagge, Wausau.

Charles H. Crownhart, chairman of the Wisconsin Industrial Commission, was elected honorary chairman of the new association, indicating still further the good feeling between the agents and the commission. If there was any doubt left in the minds of employers or agents of liability insurance companies regarding the fairness and merit of the law, it was dispelled by the facts brought out in the numerous addresses made by experts.

Among the things brought out in the speeches, the following may be briefly summed up:

That there are now 2,229 employers and 143,000 employes under the act.

That 61.9 per cent of all industrial accidents during the year ending July 1, 1913, were settled under the provisions of the workmen's compensation act.

That cumbersome court procedure and lawyer's fees are eliminated; under the old system, not more than 60 per cent of the damages awarded by courts went to the injured person, the remainder going into the pockets of lawyers.

Conclude Testimony on Fabricating in Transit

Further taking of testimony in the Interstate Commerce Commission complaint against railroad rates on steel material under the term "fabrication in transit" was concluded at Cleveland Tuesday before a special examiner. The railroads involved presented data tending to show switching costs for this material run higher than $3.05, alleged car per diem earnings. Fabricators ask commission to refuse to change present rates of 1½ cents per 100 pounds, but railroads ask 2½ cents.

BASIC TONNAGE

Bought in the St. Louis District From an Alabama Maker.

New York, July 30. (By wire.)—A steel maker in the St. Louis district has purchased 10,000 tons of forward basic from Alabama maker at $11, Birmingham. Leading southern makers held firmly to $11 for No. 2 foundry and some sellers who have been accepting $10.50 have refused offers on this basis during the past few days.

The Buffalo situation continues to harden, some leading sellers there now are holding firmly to $14 as their minimum, which represents an advance of 50 cents. It is probable, though, that not all $13.50 iron has disappeared.

CONTROLLING INTEREST

In Bessemer Coke Co. Acquired by J. H. Hillman Sons & Co.

Pittsburgh, July 30. (By wire.)—J. H. Hillman Sons & Co., Pittsburgh, have bought a controlling interest in the Bessemer Coke Co., operating in the Connellsville and Klondike regions. The purchase gives the Hillman company 2,300 acres of coking coal lands, 1,041 ovens and six operating plants with the capacity of 600,000 tons of coke annually, in addition to 200,000 tons of coal. J. H. Hillman Jr. has been elected to succeed W. Y. Humphreys as president, A. B. Sheets to succeed Herman Griffin as treasurer and K. T. Phelps to succeed William Harris as secretary of the Bessemer company. E. H. Jennings will continue as vice president.

Muck Bar Capacity Idle

Although one mill has signed the United Sons of Vulcan scale, through which puddlers ask $7 a ton, the larger manufacturers in the Pittsburgh district have not yet consented to meet the price asked by the organization. As a consequence, practically all the muck bar capacity in the territory is idle.

ERIE RAILROAD

Granted Permission to Readjust Rates on Iron Ore.

Washington, July 30. (By wire.)—The Erie railroad has been granted special permission by the Interstate Commerce Commission to establish reduced ore rates to Pittsburgh and Wheeling, meeting the rates recently filed by other lines to these points. The Erie's application to establish rates for storing ore at North Randall is denied because no explanation was given. The road no doubt proposes to store ore at North Randall because of lack of accommodations at the lake, and the rate would be the same as storage at docks. The Erie and Pittsburgh & Lake Erie, by supplemental order, are relieved from the requirement of maintaining the rate of $2.30 on coke from Connellsville to Newark, N. J.

PIPE MAKERS

Are Inquiring For Round Tonnage of Low Grade Pig Iron.

Philadelphia, July 30. (By wire.)—Eastern cast iron pipe makers have entered the market for some round tonnages of low grade metal and probably 25,000 tons of this character are now under negotiation. Some of this tonnage is to cover large pipe orders recently taken, including 10,000 tons for New York City. Pipe iron along the Delaware river according to recent sales was quoted at $14.50 to $15, delivered, depending upon quality.

GOOD SHOWING

Made by Inland Steel Co.—Earned About 20 Per Cent.

Chicago, July 30. (By wire.)—The Inland Steel Co.'s report, issued yesterday, shows surplus after dividends of $952,786. Total surplus is now over $4,700,000. Net earnings for the year were $1,992,000. About 20 per cent was earned on the capital stock.

Considerable damage was done and a number of workmen were injured late last week when gas backed up and exploded in the cold blast mains at the Carnegie Steel Co.'s Ohio Works furnaces, Youngstown, O. Several hundred feet of gas mains were torn up. Most of the roof of the 200-foot gas engine house was blown off. Furnaces 4, 5, and 6 had to be shut down temporarily as a result of the explosion.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through This Year.)

Bessemer	16.40
Basic	14.25
No. 2 foundry	14.55 to 14.90
Malleable	14.90
Gray forge	14.40

The freight rate from valley points is 90c.

CLEVELAND

(Through this Year Delivered in City.)

No. 1 foundry	$15.15 to 15.50
No. 2 foundry	14.65 to 15.00
No. 2 southern	14.85 to 15.35
Bessemer	16.40 to 16.65
Silverites 8 per cent silicon	20.55

CINCINNATI

(Through This Year.)

Southern foundry No. 1	$14.25 to 14.75
Southern foundry No. 2	13.75 to 14.25
Southern foundry No. 3	13.25 to 13.75
Southern foundry No. 4	13.00 to 13.50
Southern gray forge	12.75 to 13.25
Mottled	12.75 to 13.00
Southern No. 1 soft	14.25 to 14.75
Southern No. 2 soft	13.75 to 14.25
Standard southern car wheel	27.25 to 27.75
Southern Ohio No. 2	15.20 to 15.70
Southern No. 3	14.70 to 15.20
Southern Ohio No. 4	14.45 to 14.95
Silveries 8 per cent silicon	18.20 to 18.70

(Freight from Ironton, $1.20; from Birmingham, $3.25.)

CHICAGO

(Delivered Chicago, this year, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.)

Lake Superior charcoal, No. 1 to 4	$16.25
Northern foundry No. 2	15.00
Southern foundry No. 2	15.10
Jackson co. silverites, 8 per cent	20.40
South'n silverites, 5 per cent sil	17.35
Alabama basic	14.85
Malleable	14.75

PHILADELPHIA

(Prompt and third quarter shipment delivered to consumer's plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	15.75 to 16.00
Northern No. 2X foundry	15.75
Northern No. 2 plain	15.25 to 15.50
Standard forge (Eastern Pa.)	14.75 to 15.00
Virginia No. 2X	15.30 to 15.80
Southern No. 2	15.00 to 15.50
Standard low phos., Phila.	23.25 to 23.50
Lebanon low phos., furnace	18.50 to 19.00
Malleable	16.00 to 16.50
Basic (Eastern and Central Pa.)	15.25

NEW YORK

Prompt and third quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$15.75 to 16.00
Northern No. 2X foundry	15.25 to 15.75
Northern No. 2 plain	15.00 to 15.25
Virginia No. 2X	15.30 to 15.80
Southern No. 2	15.25 to 15.75
Malleable	15.60 to 16.00
Gray forge	15.00 to 15.25

ST. LOUIS

(Throughout This Year.)

Southern No. 1	$14.75 to 15.25
Southern No. 2	14.25 to 14.75
Southern No. 3	13.75 to 14.25
Southern No. 4	13.25 to 13.75

(Freight, Birmingham to St. Louis, $3.75.)

BIRMINGHAM

(For southern delivery.)

No. 1 foundry	$11.00 to 11.50
No. 2 foundry	10.75 to 11.00
No. 3 foundry	10.25 to 10.50
No. 4 foundry	10.25
Gray forge	10.25
Mottled	10.25
Standard basic	11.50
Off Basic	11.00
Charcoal	25.00

BUFFALO

(Through this year, delivered in city.)

No. 1 foundry	$14.00 to 14.50
No. 2X foundry	14.00 to 14.25
No. 2 plain	14.00
No. 3 foundry	13.75 to 14.00
Gray forge	13.75 to 14.00
Malleable	14.00 to 14.50
Basic	14.00 to 14.50
Charcoal	15.75 to 16.75
Charcoal (special brands)	16.50 to 17.50

Ferro Alloys

English and German 80 per cent ferro-manganese, prompt delivery $57.50 to $58.50 seaboard; forward delivery $58.50 seaboard.

Fifty per cent ferro-silicon on contracts, $75; Pittsburgh, or Philadelphia, for carloads; $74 for lager lots and $73 for 600 tons or more. Twelve to 13 per cent, $26. Eleven to 12 per cent, $25. Ten to 11 per cent, $24. Nine to 10 per cent, $23, f. o. b. Globe, Jisco and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferr-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 to 30 cents higher respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Denver	84½ cents
St. Louis	22½ cents
New Orelans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents

Coke

AT THE OVENS.

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$2.85 to 3.10	$3.00 to 3.10
Furnace coke	2.50	2.50
Wise county district:—		
Foundry coke	$2.75 to 3.00	$2.75 to 3.00
Furnace coke	2.35 to 2.50	2.35 to 2.50
Pocahontas district:—		
Foundry coke	3.00	3.00
Furnace coke	2.60 to 2.75	2.60 to 2.75
New River district:—		
Foundry coke	$3.25 to 3.50	$3.25 to 3.50
Furnace coke	2.60 to 2.75	2.60 to 2.90

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania, furnace points range from 35 to 75 cents per ton.

Semi-Finished Material

PITTSBURGH

For prompt and forward delivery, Bessemer 4 x 4 billets with 0.25 carbon and less, $26.50 to $27.00; open-hearth rolling billets, $26.50 to $27.00; Bessemer sheet and tin bars, $27.50; open-hearth sheet bars, $27.50, f. o. b. Pittsburgh and Youngstown. Forging billets, $33, Pittsburgh. Wire rods, $28 to $29; muck bar, $31, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity; 4 x 4-inch open-hearth and Bessemer rolling billets at $28 to $29, and forging billets at from $33 to $35; muck bar, $28 to $30.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.45c. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.63c.

PHILADELPHIA

Delivered to consumers in Philadelphia and vicinity. Standard structural shapes from eastern Pennsylvania mills, 1.60c to 1.65c. From Pittsburgh mills, 1.60c.

NEW YORK

Standard structural shapes delivered at New York by eastern Pennsylvania makers 1.61c to 1.66c. On forward delivery, Pittsburgh district makers are quoting from 1.61c to 1.66c, New York.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¾ to 100 inches, 1.45c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inch thick, 6⅝ to 100 inches wide, 1.63c.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity. Tank plates from eastern Pennsylvania mills for prompt or forward delivery 1.65c to 1.70c. From Pittsburgh mills, tank plates, 1.60c to 1.65c.

NEW YORK

Steel plates, rank quality, for prompt and forward delivery at New York by eastern Pennsylvania makers, 1.66c to 1.71c. Pitts-

burgh makers are quoting 1.61c to 1.66c, New York.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	2.25c
No. 28 tin mill black	2.25c to 2.30c
No. 28 galvanized	3.30c
No. 10 blue annealed	1.65c to 1.75c
No. 28 painted, corrugated	2.40c
No. 28 galvanized, corrugated	3.35c
Tin plate, 100 pound cokes	3.60c

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.90c.

Pipe and Boiler Tubes

PITTSBURGH

	Black Butt.	Galv. Weld.
Steel, ¾ to 3 inches	79	70½
Iron, ¾ to 2½ inches	72	61
BOILER TUBES.		
Steel, 3½ to 4½ inches	69	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.34c for open-hearth carload lots less than 500 tons 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c base, Pittsburgh; track bolts, 2.40c base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.70c to 1.80c.

CHICAGO

Light rails, carloads, 25 to 45-pounds, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pound and under, subject to inspection, $22 and $23; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.80c to 1.85c; smaller size spikes, 1.90c, base; track bolts, with square nuts, 2.30c to 2.40c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.65c to 1.70c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill.

Hoops in carload lots, 1.60c, Pittsburgh; in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Cold rolled and ground shafting, 60 to 63 per cent off in carloads and 55 to 57 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron, 1.48c to 1.50c; hard steel bars rerolled, 1.55c; soft steel bars, bands and small shapes, 1.58c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting, 58 per cent off list for carload lots, 53 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars, 1.55c to 1.60c on contract and common bar iron, 1.37½ to 1.47½c. Prompt steel bars on mill shipments, 1.85c to 1.90c, delivered. Cut nails 1.90c to 1.95c, Philadelphia. Shafting 62 and 60 off in carloads and 57 and 55 off in less than carloads in base territory.

NEW YORK

Delivered in New York steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.33c to 1.45c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 2.00c, Pittsburgh, cone head boiler rivets, 2.10c. Small rivets, 75, 10 and 10 off.

Structural rivets, Chicago, 2.08c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within a 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, small and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10 and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hit pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅝-inch and larger, $6.60 off; ½-inch and smaller, $7.20 off.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.70 to $1.80, retailers' carload lots, $1.75 to $1.85, cut nails (western makers), jobbers' lot, $1.70; painted barb wire, jobbers' carload lots, $1.70 to $1.80; retailers' carload lots, $1.75 to $1.85; plain wire to jobbers in carloads, $1.50 to $1.60; and to dealers in carloads, $1.50 to $1.65; polished staples, $1.70 to $1.80; galvanized staples, $2.10 to $2.20.

CHICAGO

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.08; painted barb wire, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.08, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.73; retailers' carload lots, $1.78.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $28; 6 to 12 inches, $27; larger sizes, $25; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe, 30 pounds to the foot, $23 to $25, f. o. b. New York, in carload lots.

BIRMINGHAM

Water main: 4-inch, $21.50; 6-inch and up, $20.50. Gas main: $1 per ton higher than water main. Special fittings, $47.50 to $52.50.

Old Material

PITTSBURGH

(Gross tons delivered.)

Heavy melting scrap	12.50 to 12.75
Rerolling rails	14.50 to 15.00
Malleable	11.50 to 11.75
Bundled sheet scrap	8.00 to 8.25
Iron axles	22.00 to 23.00
Old iron rails	13.50 to 14.00
Stove plate	9.00 to 9.25
No. 1 wrought scrap	13.00 to 13.50
Old car wheels	12.50 to 13.00
Low phosphorus	15.50 to 16.00
Machine shop turnings	6.50 to 7.00
No. 1 busheling	11.50 to 12.00
Cast borings	8.00 to 8.25
No. 1 cast scrap	12.50 to 13.00

PHILADELPHIA

Gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey:

Old iron rails (nominal)	$17.00 to 17.50
Old steel rails (rerolling)	14.25 to 14.75
No. 1 heavy melting steel	11.50 to 12.00
Old car wheels	12.00 to 12.50
Old iron axles (nominal)	25.00 to 26.00
Old steel axles (nominal)	17.50 to 18.00
No. 2 railroad wrought	14.00 to 14.50
Wrought pipe	11.00 to 11.50
Cast borings	8.00 to 8.50
Machine shop turnings	8.00 to 8.50
Heavy cast (broken)	13.00 to 13.50
Malleable	12.00 to 12.50
Stove plate	9.50 to 10.00
No. 1 forge (nominal)	9.50 to 10.00
Low phosphorus	15.00 to 15.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$15.00
Old steel rails (under 3 ft.)	13.00 to 13.50
Old steel rails (over 6 ft.)	11.75 to 12.25
Relaying rails	23.00 to 25.00
Old steel boiler plate	9.00 to 9.50
Malleable iron (railroad)	11.75 to 12.00
Axle turnings	7.50 to 8.00
Steel axles	18.00 to 19.00
Malleable iron (agricultural)	9.00 to 9.50
Heavy steel	11.00 to 11.25
Country mixed steel	9.00 to 9.50
Bundled sheet scrap	8.00 to 8.50

Net Tons

No. 1 R. R. wrought	$11.50 to 12.00
No. 1 busheling	9.50 to 9.75
No. 1 machine cast	11.50 to 12.00
No. 1 dealers' wrought	9.00 to 9.50
Machine shop turnings	4.50
Pipes and flues	7.50 to 8.00
Wrought drillings	4.50
Cast borings	5.50 to 6.00
Stove plate	7.75 to 8.25
Wrought iron arch bars	16.00
Wrought iron piling plate	14.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons.

Old car wheels	$13.00 to 13.50
Old iron rails	13.75 to 14.25
Rerolling rails (5 ft. and over)	12.00 to 12.50
Old steel rails (3 ft. and und.)	11.00 to 11.50
Frogs, switches and guards	10.50 to 11.00
Heavy melting steel	10.50 to 11.00
Shoveling steel	10.00 to 10.50

Net Tons.

No. 1 R. R. Wrought	$10.50 to 11.00
No. 2 R. R. Wrought	9.75 to 10.25
Arch bars and transoms	13.50 to 14.90
Knuckles, couplers and springs	10.75 to 11.25
Shafting	14.25 to 14.75
Iron car axles	19.50 to 20.00
Steel car axles	16.50 to 17.00
Locomotive tires	12.00 to 12.50
Dealers' forge	8.50 to 9.00
Pipe and flues	7.25 to 7.75
No. 1 cast	10.75 to 11.25
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.50 to 7.00
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.00 to 12.50
Cast and mixed borings	4.50 to 5.00
Machine shop turnings	4.75 to 5.25
Railroad malleable	10.75 to 11.25
Agricultural malleable	10.00 to 10.50
Angle bars, splices, etc., iron	13.00 to 13.50
Angle bars, steel	9.75 to 10.25
Stove plate and light cast scrap	8.75 to 9.25

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for Eastern Pennsylvania delivery:

Old car wheels (nominal)	$10.50 to 11.00
Steel axles	15.25 to 15.75
Old steel shafting	13.50 to 14.00
No. 1 heavy melting steel	9.00 to 9.25
No. 1 R. R. wrought	11.75 to 12.00
Wrought pipe (not galvanized)	8.25 to 8.50
Cast borings	5.50 to 5.75
Machine shop turnings	5.25 to 5.50
Heavy cast	10.75 to 11.00

Stove plate	7.25 to 7.50
Grate bars	6.25 to 6.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., 1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons.

Old iron rails	$11.50 to 12.00
Old steel re-rolling	10.00 to 10.50
Old iron axles	16.00 to 16.50
Heavy melting scrap	9.00 to 9.50
Relaying rails	18.75 to 19.25

Net Tons.

Old No. 1 R. R. wrought	$9.00 to 9.50
Bundled sheet scrap	5.00 to 5.50
No. 1 yard wrought	6.75 to 7.25
No. 1 machine cast	9.50 to 10.00
No. 1 busheling	7.00 to 7.50
Stove plate	6.75 to 7.25
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.25
Heavy turnings	5.25 to 5.75
Mixed cast	7.75 to 8.25
Breakage	5.50 to 6.00
Malleable	7.00 to 7.50

BIRMINGHAM

Old iron axles, (light)	$15.00 to 15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	12.50 to 13.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Tram car wheels	10.50 to 11.00
Light cast and stove plate	8.25 to 8.75

BUFFALO

(Gross Tons.)

Heavy melting steel	$11.00 to 11.50
No. 1 R. R. wrought scrap	13.00 to 13.50
No. 1 R. R. and mch. cast scrap	13.00 to 13.50
Old steel axles	17.00 to 17.50
Old iron axles	22.50 to 23.00
Car wheels	13.00 to 13.50
Railroad malleable scrap	12.00 to 12.50
Wrought iron and soft steel turn.	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Low phos. steel scrap	16.50 to 17.00
Old iron rails	15.00 to 15.50
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	10.00 to 10.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50

ST. LOUIS

(Dealers buying prices.)

Gross Tons

Old car wheels	$11.50 to 12.00
Old iron rails	11.00 to 11.50
Re rolling rails (5 ft. and over)	12.00 to 12.25
Old steel rails (3 ft and under)	10.50 to 11.00
Light sec. relayers (45 pounds and und.) subject to inspec.	23.50 to 24.50
Relaying rails, subject to inspect.	23.50 to 24.50
Frogs, switches and guards	10.50 to 11.00
No. 1 R. R. heavy melting steel	10.50 to 11.00
Shoveling steel	9.50 to 10.00

Net Tons

No. 1 railroad wrought	$10.00 to 10.50
No. 2 railroad wrought	9.25 to 9.75
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers, springs	9.50 to 10.00
Shafting	13.00 to 13.50
Steel car axles	15.00 to 15.50
Iron car axles	19.00 to 19.50
Locomotive tires	10.50 to 11.00
Pipe and flues	6.50 to 7.00
Tank iron and cut boilers	6.50 to 7.00
No. 1 cut busheling	8.50 to 9.00
Cast and mixed borings	3.50 to 4.00
Machine shop turnings	5.00 to 5.50
Railroad malleable	8.50 to 9.00
Agricultural, malleable	6.50 to 7.00
Stove Plates	7.00 to 7.50
Angle splice bars (iron)	10.00 to 10.50
Angle splice bars (steel)	9.00 to 9.50

Store Prices

CINCINNATI

Steel bars, 2.00c; iron bars, 1.90c; plates and shapes, 2.10c; sheets, blue annealed No. 10, 2.40c; black, No. 28, 2.85c; galvanized, No. 28, 3.95c; cold rolled shafting, round, square, hexagon and flat, 50 off.

CLEVELAND

Steel bars, 2.00c; plates and shapes, 2.10c; iron bars, 2.00c; sheets, No. 16 blue annealed, 2.40c; No. 28 black, 2.85c; No. 28 galvanized, 3.95c.

CHICAGO

Steel bars, 1.85c; iron bars, 1.85c; hoops, 2.50c; shapes and plates, 1.95c; No. 10 blue annealed sheets, 2.15c, black, No. 28, 2.80c; galvanized, No. 28, 4.00c.

PHILADELPHIA

Steel bars, 2.00c to 2.05c; structural shapes, 2.00c to 2.10c; plates, 2.00c to 2.10c.

NEW YORK

Steel bars, 2.05c; structural shapes, 2.15c; plates, 2.15c.

OBITUARIES

John R. Pickering, for 20 years an employe of the Pencoyd Iron Works, Woodbourne, Pa., as paymaster and accountant, died recently, aged 48 years.

W. T. Stockton, for many years in charge of the engine department of the Dempster Mill Mfg. Co., Beatrice, Neb., and who resigned a year ago from the Deere Plow Co. at Denver, Col., died recently, aged 42 years.

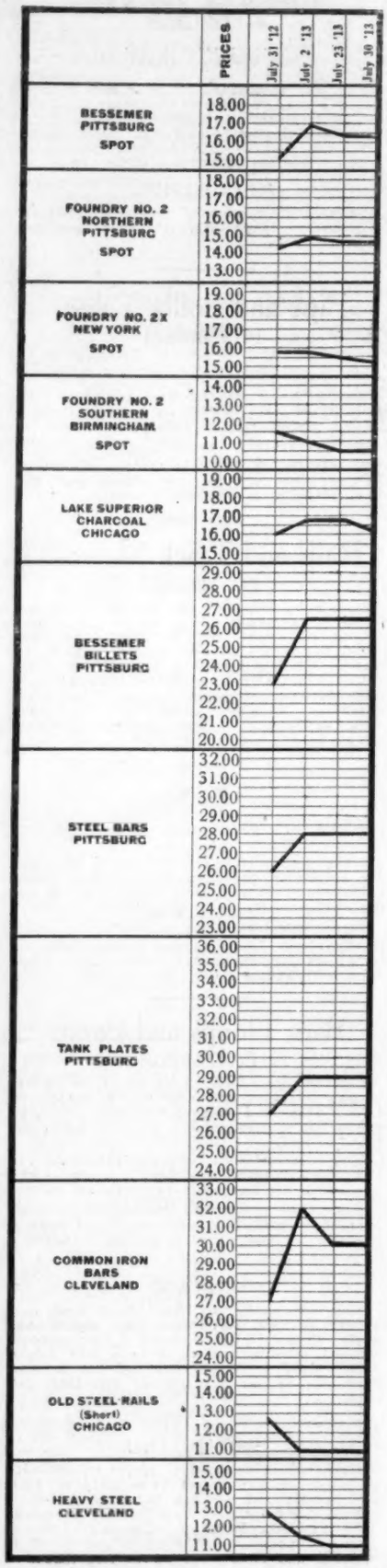
Charles H. Skinner, one of the founders of Skinner & Leary, machinists and engineers, Newark, N. J., died at his home in East Orange, N. J., July 24, aged 79 years. He established the business in Newark in partnership with John Leary in 1854.

Robert Palmer, president of the shipbuilding firm of Robert Palmer & Son., Noank, Conn., died July 20, aged 89 years. He inherited the business from his father, John Palmer, who founded it. During his life he built 674 vessels of various classes.

Walter Brown, who for the past six years has been head of the power department of the Bethlehem Steel Co., was drowned recently in the Lehigh canal, while canoeing along Freemansburg. He was unable to swim. Mr. Brown was 41 years old and leaves a widow and three children.

Ephraim Bayard, 45 years old, superintendent of the American Steel & Wire Co.'s plant at Donora, Pa., died recently at the West Penn hospital, Pittsburgh. He had been superintendent of the plant for 23 years and for some time previous to his appointment, was with the American Steel & Wire Co. at Cleveland.

PRICE CHART



Russell Sage Laboratory, Rensselaer Polytechnic Institute, Troy, N. Y.

The Equipment of a Modern Engineering School

At Rensselaer Polytechnic Institute. Troy, N. Y., a new building recently was completed which marks an important stage in the development of this time-honored and well-established seat of engineering education. This is the new Russell Sage laboratory, which, by reason of the extent of its equipment, affords unusual facilities for the teaching of practical engineering.

This laboratory was built and equipped at a cost of $405,000, being made possible by the philanthropy of Margaret Olivia Sage, widow of Russell Sage, who for 10 years prior to his death in 1906 was a member of the board of trustees of the Institute. Mrs. Sage gave $1,000,000, of which $300,000 was expended in erecting and equipping the laboratory, while the remaining $700,000 was put aside as a perpetual fund, the income from which is to be expended for maintenance.

Constructed of brick, with limestone trimmings, the Russell Sage laboratory is an imposing building, located on the brow of a hill overlooking the city of Troy and the Hudson river valley. It is the largest structure on the Rensselaer campus, being 80 x 246 feet, with the exception of the center section, which is 50 x 100 feet.

Rensselaer Polytechnic Institute was founded in 1824, by Stephen Van Rensselaer, as a school of practical science. One or two schools of science were founded in this country a few years before this date, but they did not have a continuous existence, and Rensselaer consequently is the first school of science and the first school

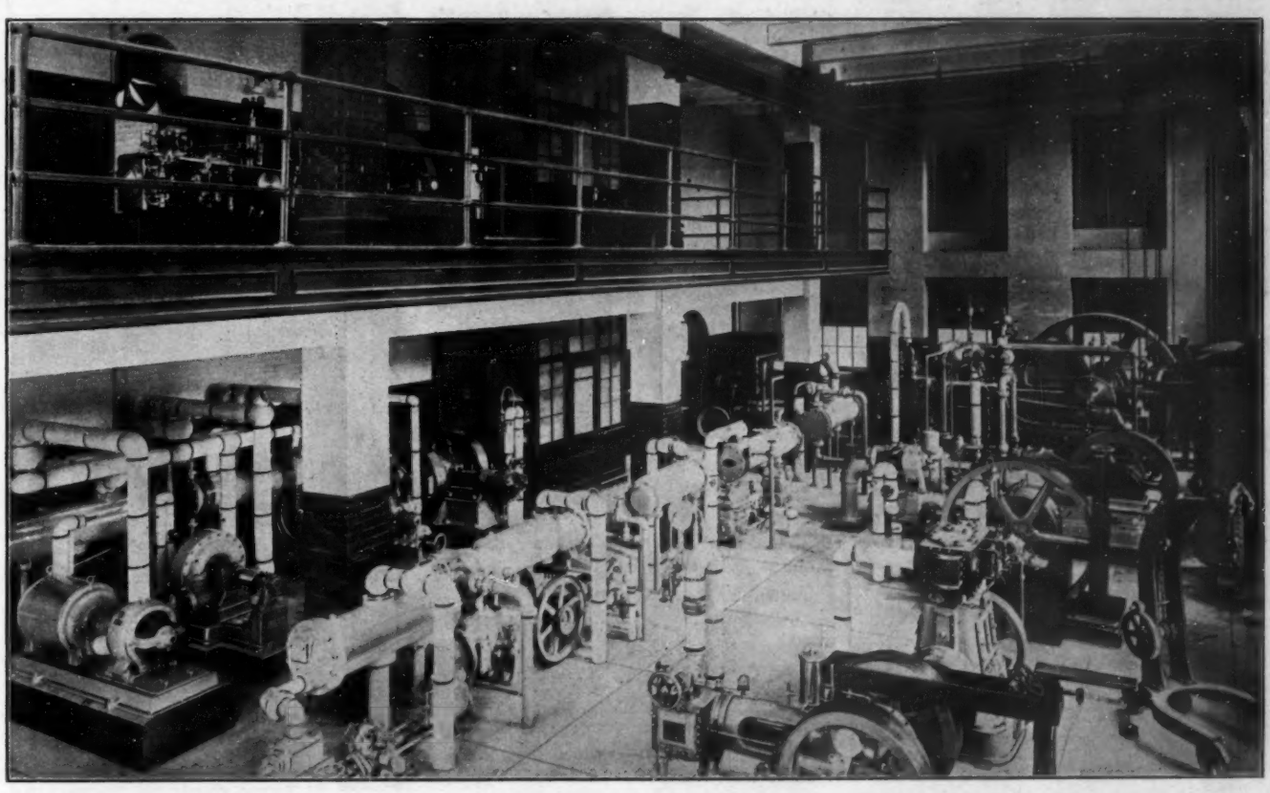


FIG. 1—VIEW OF STEAM LABORATORY, SHOWING VALVE-SETTING ENGINE IN GALLERY

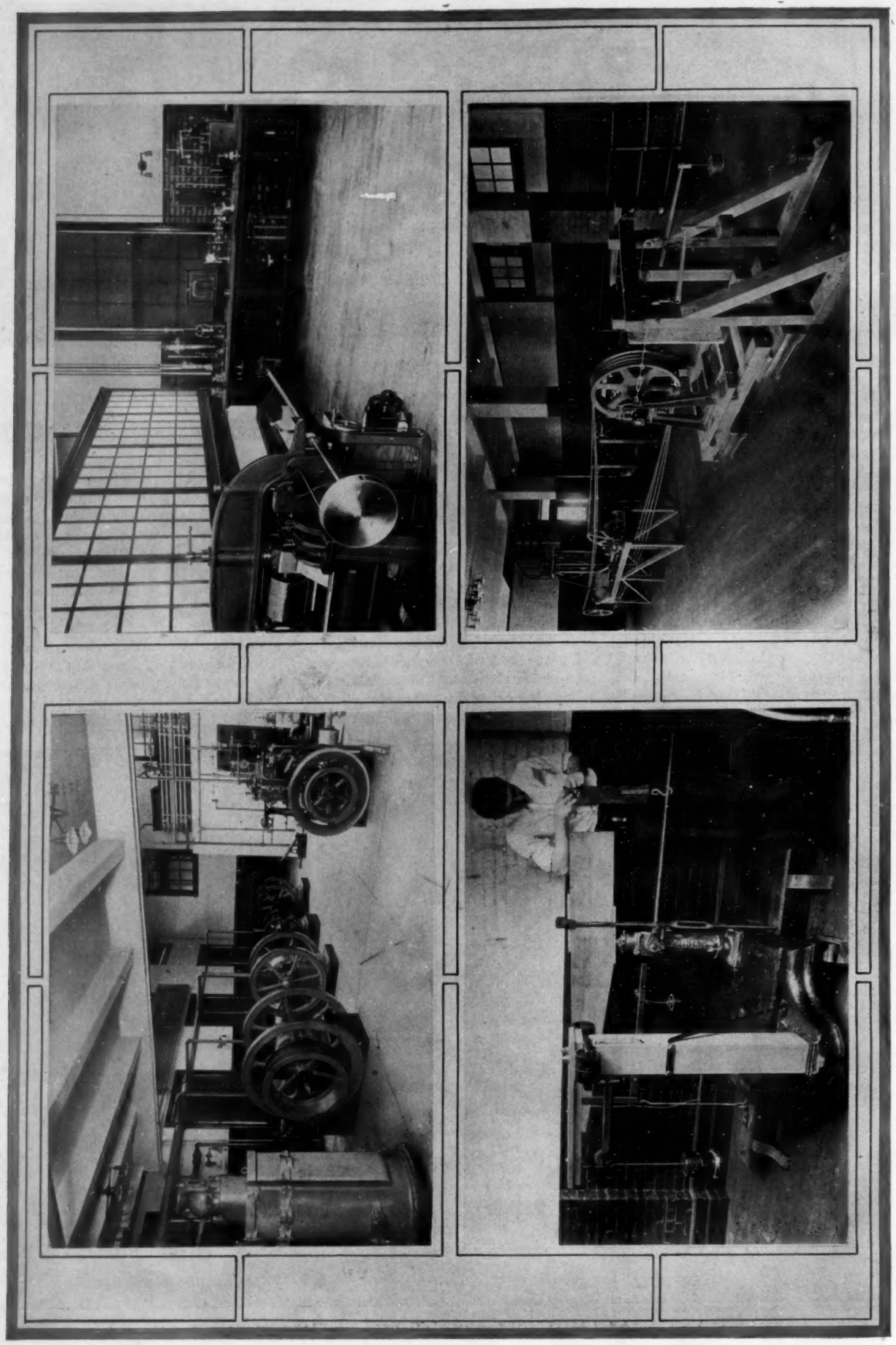


FIG. 2—SUCTION GAS PRODUCER, GAS ENGINES AND REFRIGERATING PLANT

FIG. 3—SECTION OF OIL, GAS AND FUEL LABORATORY

FIG. 4—METHOD OF TESTING A JACK FOR EFFICIENCY

FIG. 5—APPARATUS FOR TESTING ROPE DRIVE

of engineering to be established in any English speaking country which has given uninterrupted courses of instruction.

Science only was at first taught, but a course in civil engineering was soon established. Although many improvements were made in this engineering course, from time to time, it was not until 1906 that separate courses in mechanical and electrical engineering were added. The gift from Mrs. Sage, therefore, made possible a beginning in these branches, which afforded particular satisfaction to the authorities of the Institute.

The west wing of the Russell Sage laboratory is devoted to the department of mechanical engineering. This wing is five stories, 80 x 100 feet. The east wing, 80 x 100 feet, four stories, carried in a tunnel beneath the middle of the room.

The principal engine in the steam laboratory is an 8 and 18 x 24-inch, cross-compound, Corliss engine, built by the Wm. A. Harris Steam Engine Co., according to special designs of the Rensselaer engineering department. This engine is provided with a reheating receiver and the heads of the high pressure cylinder are jacketed. The cranks are so arranged that the angular position of the pins may be changed and the strokes may be altered by changing the radius of the crank by selecting other holes in the crank discs. In this way the cylinder ratios may be varied from 1.7 to 1.3. The clearance is equalized on the ends for these changes, by fastening filling pieces to the piston. A special feature of the high pressure cylinder is the separation of the steam chest into two parts by means of a cross partition, in order that the steam may be admitted to each through a separate throttle valve. The exhaust chest is arranged in the same manner, separate exhaust pipes leading from each end to separate condensers. It is thus possible, when the high pressure cylinder is used alone, to find the amount of steam on each end of the cylinder, thus determining how the steam supply divides between the two ends, the quality at cut-off on each end, and the effect on the piston rod. The steam leakage around the piston may be found by cutting off the steam supply on one and determining the condensation on that end. The two exhaust pipes may discharge together into the receiver from which the steam passes into the low pressure cylinders, or, when necessary, the high pressure steam may be cut off and the low pressure cylinder worked from live steam taken through a reducing pressure valve. The surface condensers attached to this engine are of the Worthington type, equipped with wet discharge pumps at the bottom of each condenser and a dry air pump common to the two condensers. This equipment is designed to give low vacuum.

The steam laboratory is also provided with a 10, 16¼ and 10¼ x 10-inch air compressor of the Ingersoll-Rand type. It is of the two-stage, compression type, with two single expansion steam cylinders in tandem with the air cylinders, which are cross-connected through an intercooler. This compressor embodies in its construction all the latest features of design. The steam cylinders are equipped with Meyer valves and the air cylinders are equipped with piston inlet valves of late design. The discharge from the compressor is carried into one of two large tanks through a safety valve and three-way cock. The discharge from the compressor is kept at constant pressure as the pressure in the tank increases to the compressor pressure. When this is obtained, the air is shifted to the other of the two tanks and, from the pressure, volume and temperature of the first tank, the amount of free air compressed may be determined and then the air in this tank is discharged into the room. The steam consumption of the compression en-

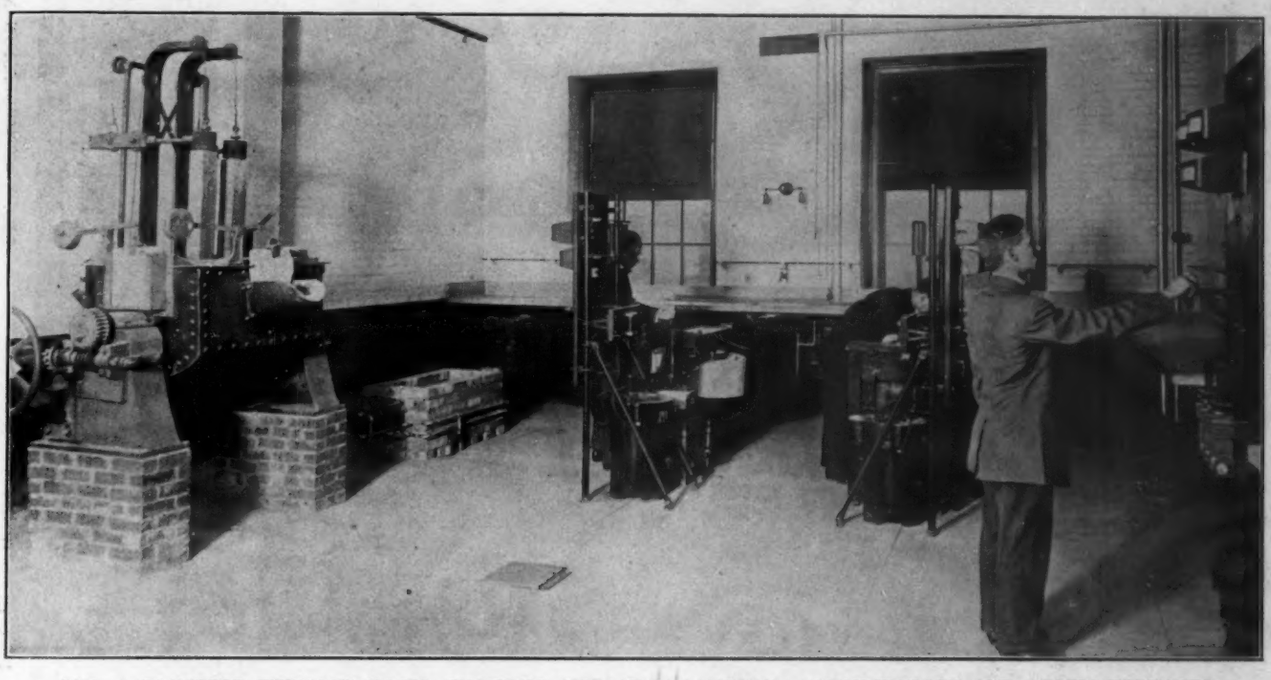


FIG. 6—ELECTRIC FURNACE ROOM, SHOWING HEROULT, ACHESON, COLBY-KJELLIN AND ARSEM FURNACES

contains the department of electrical engineering.

The west wing contains laboratories, class rooms, draughting rooms and offices. The laboratories occupy the sub-basement, basement and the larger part of the first floor, while the class rooms and lecture rooms are located on the first, second and third floors.

The sub-basement floor contains the steam, hydraulic, internal combustion engine and refrigeration laboratories. The steam laboratory covers 2,800 square feet of floor space and is equipped with steam engines, turbines, an air compressor and a superheater. One end of the room is devoted exclusively to testing machines sent to the laboratory for that purpose. The steam supply and exhaust, as well as the condensing water supply, are all

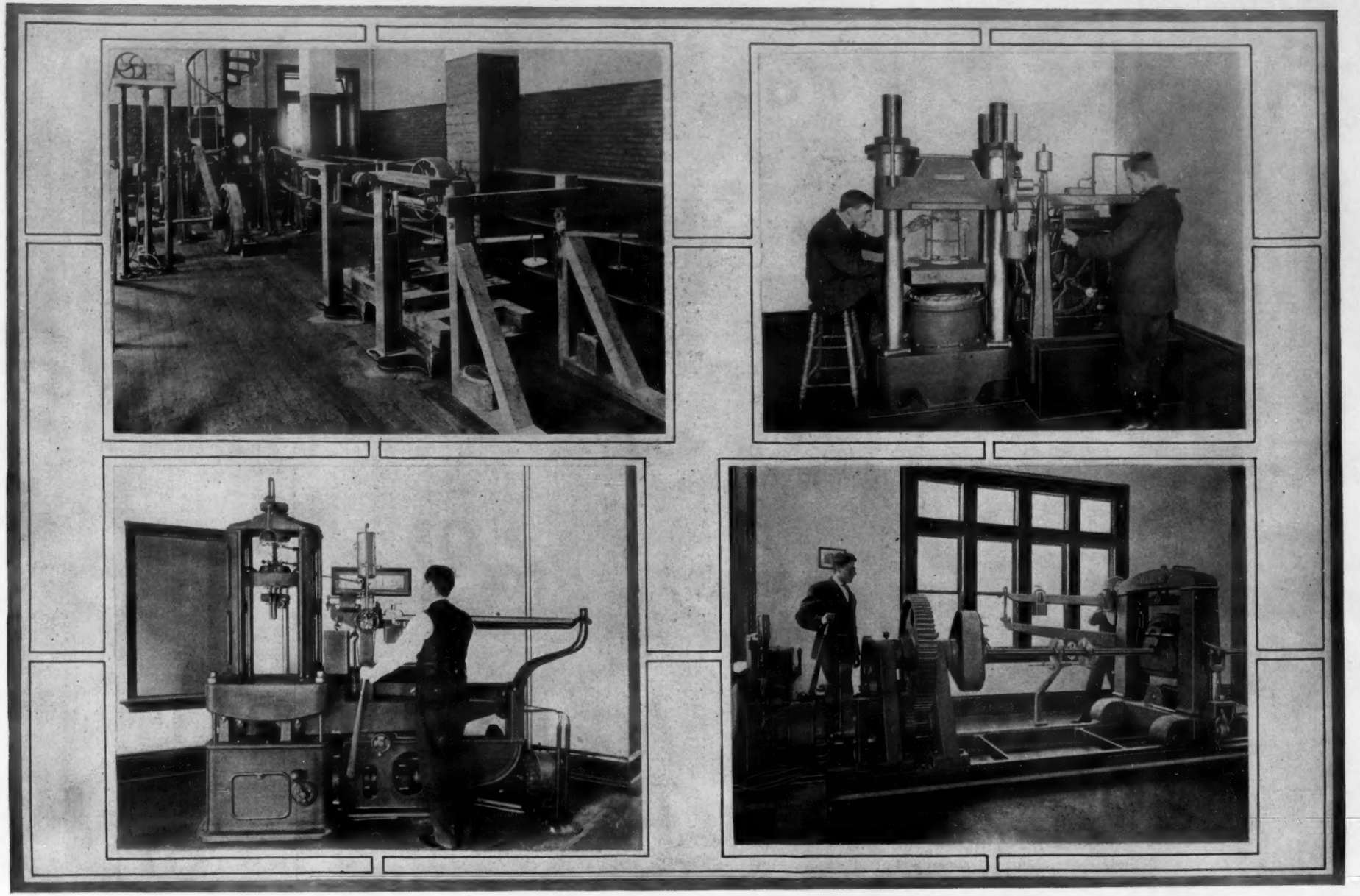


FIG. 7—TESTING A LEATHER BELT FOR EFFICIENCY
FIG. 9—AUTOGRAPHIC TESTING MACHINE, 150,000 POUNDS CAPACITY

FIG. 8—COMPRESSION MACHINE, CAPACITY 1,200,000 POUNDS
FIG. 10—TORSIONAL MACHINE, CAPACITY 125,000-INCH POUNDS

gine is determined by a non-vacuum condenser, built by the C. H. Wheeler Co.

A 5½ x 10-inch Buckeye engine, a 6¼ x 10½ x 6¼ - inch, vertical, cross-compound engine, built by the B. F. Sturtevant Co., a 7 x 7-inch McEwan engine and a 6 x 8-inch Buffalo Forge engine represent the high-speed machines. The Buffalo Forge engine is connected to the C. H. Wheeler non-vacuum condenser, the McEwan engine to a Platt Iron Works condenser, having a combined air and circulating pump, the Sturtevant engine to a C. H. Wheeler condenser connected to a Mullen valveless air pump, and the Buckeye engine to a Worthington condenser having a combined air and circulating pump.

A 10-horsepower De Laval turbine, a 10-horsepower Sturtevant turbine, and a 20-horsepower Kerr turbine, comprise the turbine equipment. These machines are so arranged that any one of them may exhaust into the air, a C. H. Wheeler non-vacuum condenser or a Wheeler Mfg. Co. condenser equipped with an Edwards air pump. The steam supply may be saturated or it may be taken from a portable Foster superheater capable of heating 600 pounds of steam per hour to 765 degrees Fahr.

The testing floor is constructed of Z-bars mounted on concrete piers and is so arranged that machines of various types may rapidly be set up. Steam and exhaust piping, compressed air and electric power leads are so located that a supply of various kinds of power is available for testing machines of all kinds.

A four-ton Maris Bros., hand-operated, traveling crane commands the entire floor of the steam laboratory and is used in erecting or repair work. This laboratory is also provided with a one-ton Dale portable crane, for use under the side galleries. The cooling water from the condensers is taken to a spraying fountain on the low roof of the boiler house for cooling, after which it returns to the cistern, located beneath the hydraulic laboratory.

The hydraulic laboratory, which covers 2,500 square feet, contains pumps, water wheels, turbines and apparatus for determining the losses in the conveyance of water, as well as the measurement of large quantities of water. The steam pumps are placed along the main aisle.

The simpler types of impulse turbines are represented by a 12-inch Doble water wheel and a 12-inch Pelton wheel, while an Escher, Wyss & Co. wheel represents the European development of this type of high head wheel. These wheels receive water from a Worthington duplex pump or from a high head centrifugal pump, after the water has been passed through a large air tank to equalize the pressure. The air tanks are charged by a small motor-driven air compressor. A 10-inch Leffel turbine is installed over the long flume for turbine investigation, this turbine taking its supply from a 25,000-gallon tank on the floor, under a head of about 20 feet. The discharge from this and the other apparatus is cared for by a cistern having capacity of 25,000 gallons, located beneath the floor. Most of the pumps draw from this cistern and by properly connecting them, 3,000 gallons a minute, under a head of 20 feet, are available for testing water wheels.

The discharge from the water wheels, turbines or pumps is measured by flumes, of which there are five, or by Venturi meters, and provision is made for determining quantities by Pitot tubes, calibrated nozzles, floats, current meters and aprons. The long flume is used for channel experiments. The flumes, which are of concrete construction, are provided with permanent measuring tubes for investigations of changes in head and velocity along and across channels.

The hydraulic laboratory is provided with apparatus for investigating friction in pipes, bends, valves and other obstructions and for the determination of co-efficients used in hydraulic work. The calibration of water meters and experimental work

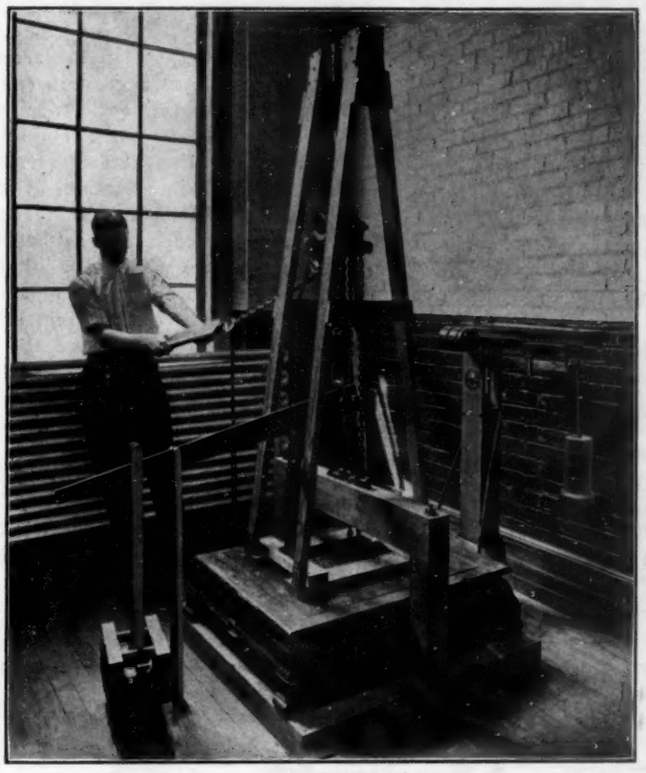


FIG. 11—METHOD OF USING HOIST TESTING APPARATUS

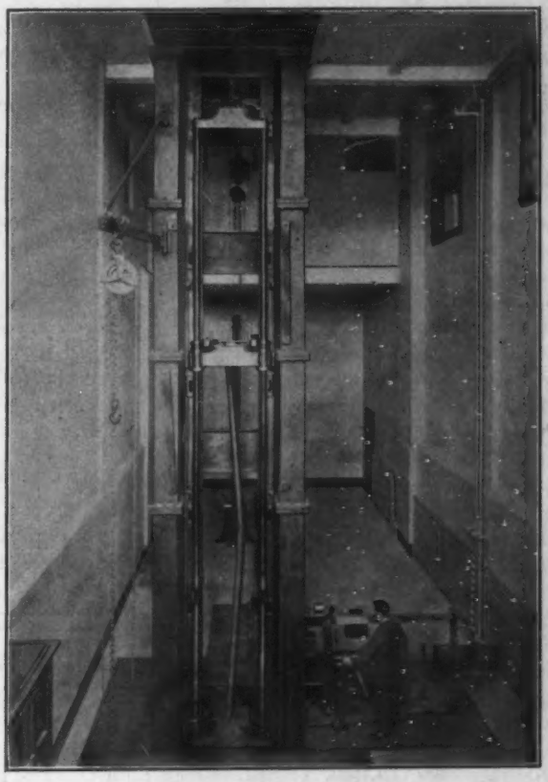


FIG. 12—A 600-000-POUND TESTING MACHINE IN OPERATION

with the hydraulic rams and injector is performed on the basement floor, where space is available for this purpose.

There has recently been installed a flume, 95 feet long and 4 feet square, for testing current meters and for making other hydraulic experiments on the resistance of ship models or other floating bodies. For this purpose, a car is mounted over the flume to which current meters or Pitot tubes may be attached. The records of distance traveled, time in half seconds and revolutions of meter are recorded electrically on a chronograph. These readings are all made simultaneously, thus making it possible to obtain exact results.

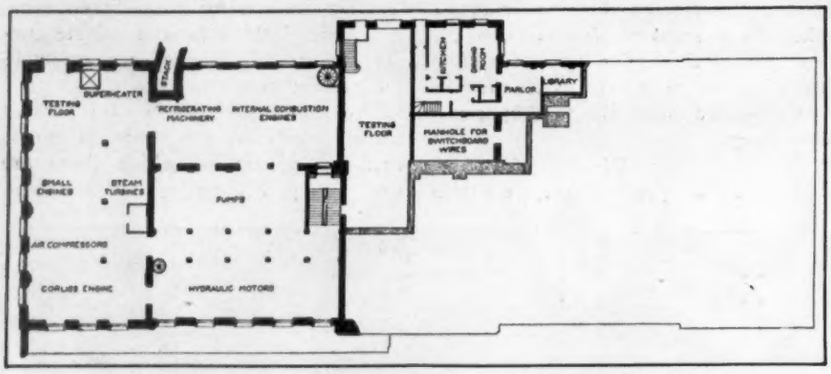


FIG. 13—SUB-BASEMENT PLAN OF SAGE LABORATORY

The internal combustion engine and refrigeration laboratory covers 1,600 square feet of floor space and is equipped with gas, gasoline, alcohol, oil and hot air engines and an ammonia compressor. The equipment includes a 12-horsepower Otto gas engine direct-connected to a small suction gas producer; a 12-horsepower Fairbanks-Morse engine which operates on illuminating gas, gasoline or alcohol; a 2½-horsepower Meitz & Weiss kerosene engine; a 10-horsepower DuBois engine, which operates on gasoline or gas; a 3-ton steam-driven Frick ammonia compressor; a 6-horsepower Secor oil engine; a 6 x 8-inch, two-cylinder Westinghouse gas engine; a Rider-Ericsson hot air engine and an Ericsson hot air engine.

The basement contains the fan room, valve setting laboratory, space for water meter testing, transmission laboratory, generating plant, space for testing injectors and the hydraulic room, as well as the repair shop for the mechanical engineering department. The fan room contains the following equipment: A two-stage blower made by the Buffalo Forge Co.; 34-inch Sirocco blower, 30-inch Sturtevant ventilating fan and a Roots blower. These are motor-driven, and are so arranged that the power input may be determined.

The valve-setting laboratory is equipped with a Murray Corliss engine and a Sturtevant slide valve engine. These are arranged for valve-setting by measurement or by the indicator; in the latter case, compressed air is used.

The transmission laboratory is equipped with apparatus for testing belt and rope transmission as well as the efficiency of various forms of gearing. The equipment for rope and belt drive testing, as shown in Figs. 5 and 7, is of special interest. Prof. A. M. Greene Jr., who designed it, has prepared the following description of the apparatus:

The equipment for testing rope and belt drives comprises an improved Briggs belt dynamometer and a Kenerson transmission dynamometer driven through a countershaft from a 10-horsepower motor. The transmitting shaft of the Briggs dynamometer is fitted with a three-groove rope sheave for testing rope drives, while the Kenerson is arranged for belt testing.

To determine the power at the transmitting shaft an ordinary pressure gage is connected to the pressure chamber, and is calibrated with a prony brake to give torque corresponding to the gage reading. The prony brake is then removed and the rope or belt drive is placed in position and the horsepower input is found from the speed and the gage reading for torque. The power delivered by the drive is determined with a dynamometer, consisting of two scales supporting a wooden base through knife edges. On the base is placed the pedestal supporting the receiving shaft. The pedestal is placed on rollers so that its position can be changed horizontally, though during a test it is kept in a fixed position by the counterbalancing weights and wires attached to the fixed uprights at the end. Since the sum of the belt tensions remains constant there is no tendency for the pedestal to change its position. When the apparatus is stationary, the sum of the two scale readings, W_1 and W_2, will represent the weight of the parts, and if the receiving shaft is in a central plane between the knife edges, the scale readings should be the same. When in motion the torque at the receiving shaft tends to produce a rotation of the pedestal, which tendency is resisted by the scales; hence the reading of one will increase while that of the other will decrease a corresponding amount, the sum always remaining constant. Load is obtained by a prony brake supported by the pedestal base.

The hoisting room contains various commercial hoists and jacks so arranged that the efficiencies may be determined and a study made of their construction and operation. The equipment for testing hoists and jacks, as shown in Figs. 4 and 11, was designed by Prof. Greene.

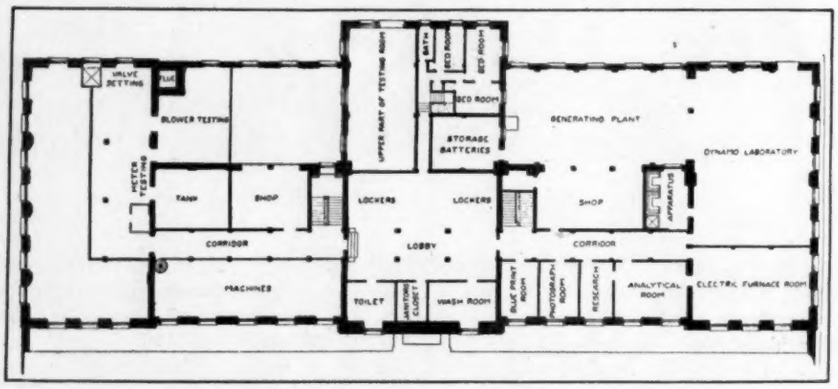


FIG. 14—BASEMENT PLAN OF LABORATORY

The hoist tester and the jack tester are similar in construction and method of operation. As shown in Figs. 4 and 11, a large platform scale is used to determine the load on the hoist or jack, while a spring balance is used to measure the pull or force applied.

The hoist tester consists of a wooden

horse resting on the platform scales and is used to support the hoist. The scale itself rests on a frame carrying a yoke extending over the scale platform, to which the load lever is attached. Any desired load can be readily obtained by adjusting the position and weight of the poise on this lever. After the hoist is in position, and before the load chain is connected to the load lever, the scale is balanced so that the scale reading during a test will represent the load on the hoist. The force applied to the power chain is found by applying the pull through a spring balance and noting its reading. At the instant of reading the load lever should be approximately horizontal and moving up at a uniform rate. Then the actual mechanical advantage

$$= \frac{\text{Reading of platform scale}}{\text{Reading of spring balance}}$$

The efficiency then becomes: Efficiency $= \frac{\text{Actual mechanical advantage}}{\text{Theoretical mechanical advantage}}$

In the jack tester the jack rests on the platform scales and the load is applied through a system of levers. The pull is applied to the power lever with a spring balance at a definite radius, *R*, from the center. Then the mechanical advantage $= \frac{\text{Reading of platform scale}}{\text{Reading of spring balance}}$ and the efficiency $= \frac{\text{Actual mechanical advantage}}{\text{Theoretical mechanical advantage}}$ where the theoretical mechanical advantage $= \frac{2\pi R}{\text{Distance jack head moves per revolution of the power lever.}}$

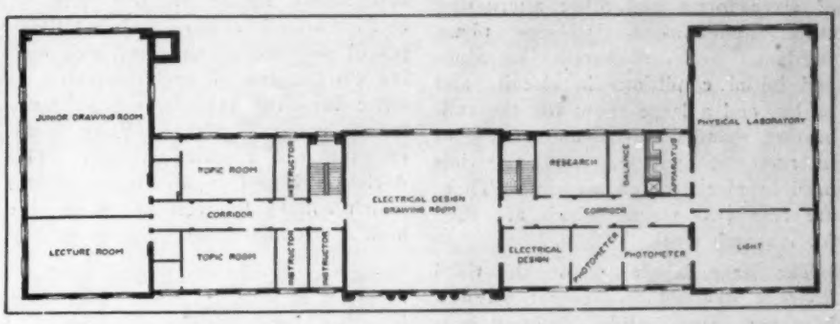


FIG. 16—THIRD FLOOR PLAN

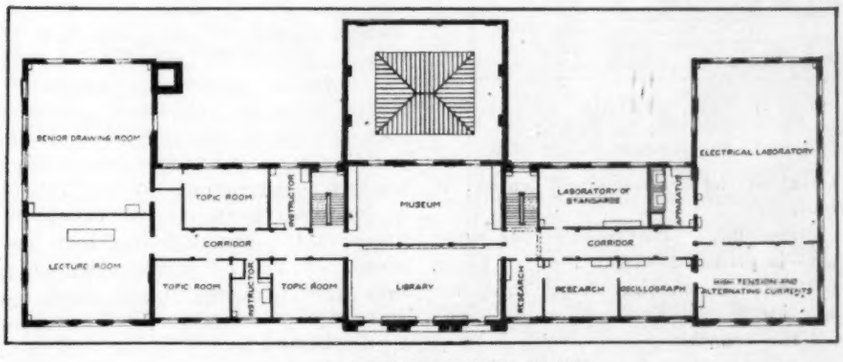


FIG. 15—SECOND FLOOR PLAN

The heating and ventilating laboratory is equipped with various kinds of radiators for direct heating, and a pipe coil and fan blower for a study of indirect methods of heating. The arrangement of the apparatus is such that the heat used in the coils or radiators may be determined simply and accurately. The power used for ventilation is determined from the motor by means of ammeters. For testing pipe covering, a special arrangement of pipes and drip pots is employed. The standard room contains the higher grade instruments for use in the laboratories or for comparison.

There are also in this wing of the building, several rooms in which are stored such instruments as are not attached to the apparatus on the sub-basement or basement floors. These rooms are equipped with shelves, drawers and lockers for instruments, so arranged that all the apparatus for one machine is kept together.

In the sub-basement is also located a repair shop, which is equipped with lathes, shapers, milling machine, drill presses, grinder, etc., for making repairs and for constructing new apparatus.

Power Plant

The east wing of the Russell Sage laboratory contains the generating plant, dynamo laboratory, storage battery and transformer rooms, the electro-chemical laboratory, etc. The generator plant is equipped with two 25-kilowatt, 110-volt, direct-connected generators, one of which is driven by a cross-compound, marine type engine, and the other by a Curtis steam turbine. In addition, there are two 25-kilowatt, synchronous, motor-driven, 110-volt generators for supplying direct current; two 25-kilowatt, motor generator sets supplying three-phase current, one at 60 cycles and the other at 25 cycles; a 15-kilowatt, induction, motor-driven, exciter set with Tirrell regulator; a 25-kilowatt, three-unit set consisting of an induction motor connected to two low voltage, direct current generators supplying for electrolytic and standardization purposes, 3,000 amperes at eight volts, or 1,500 amperes at 16 volts; and a 30-ampere, mercury arc rectifier.

The main switchboard for the control of all circuits in the Sage laboratory and the other buildings of the institute is located in the generator room. The equipment of this room includes a two-ton, three-motor, electric traveling crane with floor control.

The electric furnace equipment includes a 50-kilowatt Heroult furnace and a 10-kilowatt induction furnace of the Colby-Kjellin type for experimental work in the refining of steel and the manufacture of alloys, an experimental Arsem furnace for reseach work in vacuum and an Acheson furnace with water-cooled electrodes for the manufacture of graphite, titanium, carbide, etc. The generating plant is equipped with two low-voltage generators, supplying with the two generators parallel, 3,000 amperes at eight volts. By this means, the various technical processes for the reduction or purification of metals such as copper, aluminum and lead are carried out by electrochemical means.

Testing Electrical Equipment

The dynamo room is used for testing generators and motors and the floor is so constructed that machines may be quickly set up and adjusted. The apparatus is of great variety and includes generators of a number of types, alternators, alternator with exciter, rotary converters and a number of motors of various types. A special feature of this room is an electric railway motor testing set, consisting of two 25-horsepower, 550-volt motors mounted on an interurban truck, with friction wheels, flywheels, water brakes and traction dynamometer, air and hand brakes and a full equipment of instruments for a complete series of tests. The labora-

tory is equipped with voltmeters, ammeters, wattmeters, frequency indicators, tachometers, prony brakes and other necessary apparatus for carrying on tests on all the machines at the same time.

On the second floor are located a laboratory for electrical measurements, a smaller laboratory for studying the phenomena of high tension and alternating currents, a room for the study of wave forms and other alternating current phenomena, including phase relations, field discharge, resonance and initial conditions in circuits and cables, and a large room for the calibration, standardization and testing of instruments, apparatus and materials used in electrical engineering. There are also two rooms which are used for research work.

The large laboratory on the third floor is devoted to general physics, heat and sound, while adjoining it is a room devoted to the study of light. This room is so connected with the adjoining rooms that a photometer bench, 140 feet long, can be obtained for the measurement of powerful light sources. The third floor also contains a room for physical research and a large drawing room for electric design.

Two of the materials testing machines under the control of the department of Rational and Technical Mechanics are located in the Russell Sage laboratory, the remainder being housed in the Williams Proudfit laboratory. One is a 600,000-pound, automatic, motor-driven, vertical, Olsen machine. It will take columns 24 feet long and beams 20 feet long. The other is a Fremont impact machine, provided with two anvils and hammers for specimens of steel and cast iron. Bars of cast iron, two feet in length or less, can be treated under a weight of either 10 or 15 kilograms, the drop being four meters or less.

Williams Proudfit Laboratory

The Williams Proudfit laboratory, located near the Sage laboratory, is equipped with a large quantity of apparatus for testing the strength of materials of engineering, and may, therefore, be considered as supplementary to the latter. The basement contains the paving brick and road materials testing departments, bins, storage tanks for concrete blocks, the concrete mixing room, general switchboard controlling the electric machines throughout the building, etc. The testing machines are located in various parts of the building and include a 1,200,000-pound Olsen, vertical, hydraulic, compression machine operated by a plunger pump direct-connected with an electric motor; a 125,000 - pound Riehle torsional machine, direct-connected to a motor, which will take shafts as large as 3½ inches in diameter and 16 feet long; a 300,000-pound vertical, automatic, Olsen machine which will take compression specimens 3 feet long and tension pieces 5 feet long; a 50,000-pound, Olsen machine, a 150,000-pound, automatic and autographic Riehle machine with direct-connected motor, and a 10,000-pound wire testing machine. For testing the fatigue of such materials as enter into the manufacture of automobile and car axles, a White-Souther endurance machine is used. This device is belted to an electric motor which rotates the test specimen at a high speed and produces a reversal of

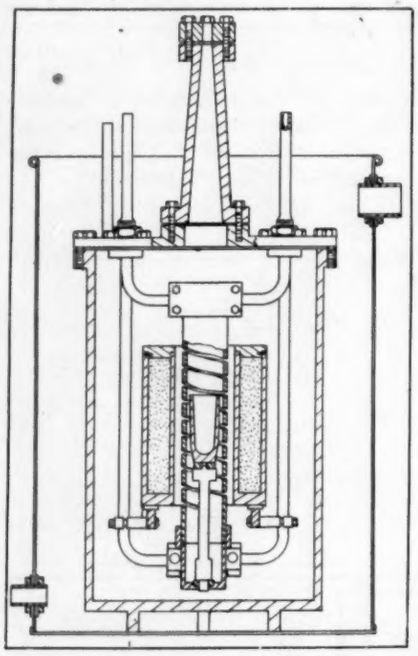


FIG. 17—CROSS-SECTION OF ARSEM VACUUM FURNACE

stress in the specimen with each revolution.

Rensselaer Polytechnic Institute also is provided with a foundry, forge, pattern and machine shops, these being located in two smaller buildings on the campus.

The members of the faculty of Rensselaer Polytechnic Institute who are in charge of the courses in the Russell Sage laboratory, have all had a great deal of practical experience. Dr. William L. Robb, professor of electrical engineering and physics, was educated at Columbia university and studied three years at the University of Berlin. He is consulting engineer of numerous corporations, notably the Hartford Electric Light Co., the New York Ship Building Co., the General Electric Co. and the Troy Gas Co.

Prof. A. M. Greene Jr., head of the department of mechanical engineering, beside having been a member of the faculties of the University of Pennsylvania and the University of Missouri, was connected with the office of chief engineer of the Philadelphia Rapid Transit Co. and was mechanical engineer for the Natural Export Exposition of 1899. He has written a number of text books on mechanical engineering.

Dr. M. A. Hunter, professor of electro-chemistry, studied under Sir William Ramsay in London, and under Profs. Nernst, LeBlanc and Moissan in Germany and France. He was engaged in the research laboratory of the General Electric Co. from 1905 to 1908, when he was appointed to his present position. He is now engaged in pursuing original investigations in the preparation of pure metallic titanium and its industrial applications.

Lewis Ferry Moody, professor of hydraulics, is consulting engineer for the hydraulic department of the I. P. Morris Co., Philadelphia. He also does consulting work for a number of other concerns. E. D. Nelson Schutte, associate professor of electrical engineering, has had much practical experience as a draftsman for the Pennsylvania Railroad Co. He was in charge of the Atlantic City Electric Railway Co. in 1900-1 and is now consulting engineer to the W. & L. E. Gurley Co., Troy.

Antimony and Bismuth

In a bulletin by Frank L. Hess recently issued by the United States geological survey are given the production of antimony and the importations of bismuth in 1912. The amount of antimony contained in antimonial lead of domestic origin last year was only 1,244 tons against 1,543 tons the previous year, while the imports of bismuth aggregated only 182,840 pounds. No antimony has been produced in the United States from domestic ore and no domestic antimony ores have been mined and marketed since 1907. No bismuth ore was mined in the United States during 1912. Metallic bismuth is employed largely in making low fusing alloys or metals which are used in automatic fire sprinklers, fuses for electric wiring and solders. Selenium, one of the rarer metals, is reported as having been produced by one smelting company in 1912 and its value is estimated at $2.50 per pound. The selenium produced was obtained from the anode muds left in the electrolytic refining of copper.

How Materials for Automobiles Are Inspected[1]

A Description of the System Employed by the Packard Motor Car Co., Detroit—The Gages Used and Their Application

By E F Roberts

There is no more positive evidence of the general desire among American manufacturers today to deliver to the buying public a dependable product, honestly made, than the general interest in inspection methods. In large industries, perhaps the first feature that should be considered in an inspection system is the relation of its personnel to the rest of the organization. To secure the determined and inflexible adherence to the standards of quality and workmanship laid down by the management, members of the inspection department cannot be in any degree subject to the control of any shop foreman or any executive directly producing. It is an emphatic axiom that the average workman thinks of his job first and duty afterward; and an inspector refusing to pass defective work for a foreman who can discharge him is, commercially, an imaginary quantity.

Productive Departments

For convenience of administration the plant of the Packard Motor Car Co. is organized into six productive divisions designated as chassis, body, truck, forge, foundry and service divisions. Each division constitutes a unit in itself, not only as regards productive organization, but also as concerns its inspection force. Each division's inspection corps is in charge of a general head and over all the division extends the authority of the chief inspector. This executive is responsible directly to the general superintendent, is personally a thorough and experienced mechanic, familiar with general engineering practice, standards and limits, and also an expert as regards manufacturing conditions, gages, systems, tool design, etc. With his assistant and through the division heads and foremen inspectors in charge of buildings and, in some cases, large departments, he is in direct control of every inspector in the plant.

Foremen inspectors may, to a certain extent, perform actual inspection work, but their duty is essentially that of maintaining the efficiency of the men and methods under their supervision. They must be actively watchful of the care used in checking parts, must see that all parts brought up are handled promptly and that gages and instruments are properly used and, above all, kept continuously in first-class condition. Through their personality the policy and standards of the entire inspection system must be impressed upon every individual in it and the quality of their department output is a standard for which they are directly responsible. Regular department foremen may report infractions of discipline by inspectors and have prompt action taken by the chief inspector, but individual inspectors in departments are wholly free from any constraint in criticising poor workmanship.

Every operation and every part is passed or rejected absolutely upon its conformity, or lack of it, with the blue print. Large placards are conspicuously posted in every department warning inspectors that immediate discharge will result from passing work on any other basis, except written authority of a general executive. Every possible means is thus employed to impress upon the inspectors that their sole responsibility is the maintenance of quality, and that their positions depend upon this and nothing else. An inspecting force, although necessarily recruited from various sources, should consist mainly of men of previous experience and training in other mechanical departments of the plant. All inspectors should further, when first assigned to this duty, be placed in company with an experienced man and their work carefully watched for a number of days before giving them individual assignments. Special care should be exercised in selecting and examining them; they should be well paid and every possible effort made to hold satisfactory men permanently on the line of work in which they have become expert.

The function of an efficient inspection department should begin even before the drawings are approved in the engineering department. The chief inspector should be *ex officio* chairman of the limit committee, whose duty it should be to pass on all drawings to determine whether the limits assigned by the designer are commercially practicable, thus insuring the elimination of many possible sources of later friction and delay. After the drawings for a new design are approved and signed by the limit committee, and not until then, they should be issued to the various functional divisions, the set in which the inspection department is interested being that sent to the tool room. These, of course, should be checked over to determine the new tools and fixtures required—and also on the inspection department's behalf—to determine the new gages necessary, preparation thus being under way for the inspection of the finished product, in some instances, even before the raw material is ordered.

Material Specifications

Material should be for inspection purposes divided into raw stores, including bar, tubing and sheet metal; car parts rough, comprising castings, stampings and forgings, body parts rough, such as lumber, leather, glass, trimming fabrics, and car parts finished and semi-finished. To insure uniformity of composition and quality all metals should be bought on the basis of standard analytical specifications, developed by the engineering department through laboratory test and research. Supply firms, before making up an order, should send in sample test pieces for approval, insuring in this way almost invariable conformity with the specifications and eliminating delays and arguments. In the case of ordinary bar stock, as soon as a consignment is received and checked in as per invoice, it should be inspected for size, limit snap gages being used and each end of each bar being checked. Straightness also should be noted, as occasionally a bar may be found that would not pass readily through the machine collets. A bar should then be selected at random and a test piece 3 or 4 inches long sawed off. This should be tagged with the date, amount of consignment, grade of metal and the purpose used for, and forwarded to the laboratory for analysis.

The laboratory is exceptionally com-

[1]From a paper presented at the summer meeting of the Society of Automobile Engineers.

plete and well equipped for analytical and physical research. It is in charge of a chemist and engineering specialist of wide experience; and every imaginable determination required in industrial engineering can be covered in this department from the crystalline structure of the antimony content in crankshaft bearings to the tons of pressure required for the breakage test of a front axle. Special rush service can always be had from a laboratory of this description in 12 hours, although ordinarily two days are allowed. As soon as the test piece has been removed, each bar should then have the grade number and date stamped on the end and the consignment should be placed in the regular rack pending receipt of the laboratory release.

Designating Accepted Stock

After analysis, the duplicate stub from the specification tag will be removed by the laboratory and returned to the stock department, thereby either releasing the consignment for factory use or rejecting it as unfit. If the analysis is satisfactory, the stockkeeper should then paint the ends of all bars in this lot with the standard color for that grade, indicating its readiness for use. To insure this method being given proper attention, personal instructions must be issued, and as a further precaution, signs should be posted warning the men that painted ends must never be cut off and that all bars must be placed in the racks, painted ends out. If the laboratory analysis shows the sample below grade limits, the stock department should notify the purchasing department and arrangements should at once be made either for the return of the consignment or its substitution for any other use for which it may still be fit. Bar stock intended for special use, such as piston pins, universal joint pins, etc., or selected stock, should be kept in special separate bins.

The same general method should be followed in the inspection of tubing, excepting that it must be checked for inside diameter or thickness of wall, as well as outside diameter, and also for eccentricity. Standard sheet metal, aluminum, brass, copper, steel galvanized sheets, etc., from established firms need ordinarily be checked only for gage and general appearance and accepted without analytical test. In the case of stamping stock, however, a test strip 1½ x 12 inches should always be submitted for analysis and tensile test. In such instances the same procedure would be gone through with as in the case of bar stock, except that a different method of marking must be used.

For insuring the correctness of forgings, the regular practice should be to submit a lead proof for a preliminary check before the dies are hardened. The lead as soon as received should be delivered to the purchasing department for record and forwarded by it to the engineering department for general checking as to design specifications. If satisfactory it should then be transmitted to the tool department, where it must be laid out and carefully gone over in detail with the drawing, and this opportunity should also be improved for comparing it with the design of any fixtures and gages relating to this part. As soon as this check is completed the tool room inspector should immediately advise the purchasing department as to approval or rejection.

If approved, as soon as delivery of forgings begins, a few of the first may be selected at random and again checked over in every detail to cover any possible deviation on the dies or negligence on the part of the operator. Important parts subjected to heavy stresses, such as axles, steering levers, steering worm, transmission gears and parts, should invariably pass the analytical test for every consignment also before being released. Once the correctness of the dies has been established, forgings need not individually be checked for detail specifications, but every one must still be carefully examined for flaws, cold-shuts, etc., and every now and then a single forging should be again inspected in every detail of dimension and material to insure the continuous maintenance of the original standard.

Inspection of Castings

Patterns for castings should in every instance be closely checked by a special inspector before being released for use, thus eliminating chance of error as much as possible, in the initial state. As soon as the first casting from any pattern is completed, it should be at once forwarded as a test sample and submitted to the same inspection and detail checking as that given forgings and the same routine may be followed in rejecting or accepting it and approving delivery. In the foundry, test bars are run from every melt and regularly analyzed and tested for physical properties. Individual castings are inspected in detail as received, although not laid out for every operation.

In general casting inspection, cored holes and bosses should, however, be checked to discover any possible variations due to core shift, and the entire casting should also be carefully scrutinized for sand or blow-holes. Doubtful places must be tapped with a hammer, or, to determine leakage, tested with gasoline. The scleroscope test may also be employed in case trouble is experienced on account of excessive hardness. Stampings should be covered by an initial inspection practically the same as that given forgings, except as regards tool work, since they are usually a finished product when received, requiring ordinarily only a polishing, enameling or similar operation. Such exceptions as do require machining to any extent must be given the same thorough checking and testing that the forgings are subjected to.

Perfect Material

The methods and regulations for the inspection, analysis or test of all stock and parts entering a plant are intended to, and we believe do, guarantee the quality and fitness of every item of material comprised in the car. Perfect material, above all else, is the requisite of first importance. Poor workmanship may spoil good material, but no amount of good workmanship can ever redeem poor material.

Factory inspection of parts in process in a large organization can be best conducted almost entirely on a departmental basis. In a small plant a central inspection department possesses certain advantages, but with the growth of any business, the time required for trucking and handling must eventually make this method obsolete. In each department a central location should be selected, well-lighted and convenient, and here all inspection plates should be located as well as the head inspector and his assistants. The inspection plates used in the Packard factory are of cast iron, 24 x 57 inches, and of massive and rigid construction. They are planed and finished on top to an accurate surface and carefully used and looked after, being covered every night with a coating of oil and frequently tested for trueness.

The greatest factor in quick and thorough inspection is an efficient system of gages. There is no more common fallacy in manufacturing than the assumption that a correct set of gages once issued insures accuracy of workmanship. And a pretty general fallacy is the assumption of correctness for the gages themselves. Ordinarily the micrometer is accepted as the standard of measurement. When, however, it is remembered that

the average micrometer will alter merely by the heat of the hand to an extent of 0.0002 inch, it is obvious that the court of final appeal for accuracy must be a higher one. There can be no more absolute precision standard than the Johannson system of gages. A set of these gages consists of 81 blocks, increasing in size by graduations of 0.0001 inch. They are manufactured in Sweden, the completion of a single set requiring about five years and the surfaces when finished being so perfect that atmospheric pressure will hold a dozen of them suspended in a cluster from one held between the fingers in the same manner as though magnetized. In addition to their almost infinite accuracy they are so impervious to variations of temperature that one of them may be carefully checked in a warm room with the most sensitive instrument possible and then after being laid on ice again checked without showing the slightest variation. These gages may be accepted as the final source of authority on the accuracy of all manufacturing dimensions. They should serve as the check for all master gages, which in turn check the shop sets.

Special Gages

Special gages, of course, must be designed in the tool drafting room as soon as the original design of a new model is issued. Standard gages, however, are required in such large quantities and the efficiency of any inspection system is so dependent upon their immediate accessibility that standard blanks for snap, plug and ring gages should be carried in stock at all times. These may be made up rapidly and at low cost principally on automatics, leaving only sizing and finishing operations for the toolmaker. This method renders gage equipment so readily accessible that there is no incentive or excuse for negligence in this respect. All rough stock sent into the factory in dimension lengths should be cut to gage in the stockroom. The workman who machines it should have a gage for his operation which is a duplicate of the inspector's. The inspector's gage is thus a check on the accuracy of the workman's gage, and all the inspector's gages should in turn be checked at regular intervals with the master gages held in the tool room.

Too much emphasis cannot be placed upon the importance of properly checking and caring for the master gages. The set should be at least sufficiently complete to cover every important part. They should be given not less than three different checks with the Swedish master blocks by three different inspectors and these separate readings reconciled before being approved for use in the first place. They should be kept in vaults under lock and withdrawn only on fixed occasions or by some executive's order and then only by the man or men regularly assigned to the duty of handling them. No attempt should be made to use them indiscriminately for checking shop gages, as their function should be the control of the inspectors' gages only. Every gage in every department should be turned into the tool-crib at the close of working hours. Some of the more important ones must be checked daily before issue and very few should be permitted to be used unchecked for more than a week. Limit thread gages in particular must be checked with the master gages every few days for accuracy of dimensions and depth of thread.

All gages must be sized to the limits shown on the print and only parts coming inside these limits passed. Parts outside the limit, except where the defect is a nominal one only, such as oversize, may be sent at once to a central checking station. All parts received here should be examined daily by the chief inspector or his assistant and the division superintendent or his assistant. The reason for the defect should be clearly determined and if tools are at fault the proper correction at once made. If, as is usually the case, the cause is negligence on the part of the operator, the foreman's attention must be called to it and both he and the operator warned against a repetition. In the department itself, the inspectors, as soon as a defective lot of parts appears, should issue to the foreman a written *stop-notice* or warning that a certain operator or certain machine is producing work below standard. This will insure immediate attention, as it puts the responsibility squarely up to the foreman. When all the operations on a given part are completed in one department, the inspector's O. K. should be again required before they can be forwarded to the next one.

How Inspection is Insured

There is no possibility under the Packard method of any lot of parts accidentally escaping inspection. The operator's pay for every lot and every piece worked on is absolutely contingent on the inspector's O. K., and every workman for this reason is continuously watchful to prevent negligence on the part of his department inspector. Even dishonest inspection has little incentive since the time slips on file bear so complete a record that the responsibility for such work may be very easily determined. Thus at every step in the progress of a part it is possible to so check and safeguard it as to insure its conformity to the standard of quality.

Inspection of Driving Gear

To illustrate in detail a thorough method of supervising the maintenance of inspection standards, we may follow the development of a typical forging, the bevel driving gear, as carried through its various operations in the factory. In one respect this gear is given special inspection by receiving a supplementary analytical material test. The steel from which it is forged is given the regular laboratory analysis before being released to the forge division, but, in addition to this, because of the importance of the part in regard to both strength and quiet running, a material test is taken on each lot of forgings received. Chips are removed from a sample and analyzed, and the whole lot are held until the result of the analysis is known. The blanks after release are heat-treated and then sent to the lathe for boring and reaming the larger opening for the differential casing and turning the face of the web. The blank is then sent to the plate and the dimensions and surfaces checked. The piece is next taken to the milling machine and the four slots for the differential spider are cut. For the second time it goes to the inspector, to determine whether the slots are central, at right angles to each other, square with the surface of the web and true to size within a limit of one-half thousandth plus or minus.

Next, the outside diameter is rough-turned and the face angle finish-turned, making necessary the third trip to the inspection plate. Again the blank is sent to the lathe for finish-turning the outside diameter and the back angle and sizing the width of the tooth plane. This makes necessary the fourth inspection, after which, if passed, it is sent to have the face of the tooth plane-ground to the correct angle with the web. For the fifth time an inspector checks it before it is passed on to have the back of the web surfaced preparatory to copper-plating for hardening. After plating, the teeth are rough and finish-cut, which makes necessary inspection No. 6. The gear is next sent to the heat-treating department and first pack-hardened or carbonized. In the carbonizing pot along with each lot of

gears is placed a test piece of the same material as the gears, about 6 inches long and ½ inch square. After the specified interval for this grade of steel, the gears and test bar are removed, cooled and reheated for hardening. After hardening they are cleaned and the test bar is broken and checked for depth of case, fineness of grain and general structural appearance, as an index of the internal condition of the gears.

Strength and Hardness Test

The gear is now ready for the most important of all its inspections, the strength and hardness test. Hardness is measured by the scleroscope, which compares the condition of the part with that of the standard established by the Brinnell testing machine. Between 30 and 40 readings are taken from each gear. Strength is determined by the hammer test, a device which permits the concentration of a heavy blow of known force on a single tooth, each gear being given this test on at least four different points in its periphery. These tests may be considered as inspections Nos. 6 and 7, and are immediately followed by inspection No. 8, which is the test applied by a special fixture for determining the amount of possible distortion due to heat. This inspection is rigorous and minute, covering every tooth of every gear; and the gear that checks 0.002 inch eccentric on the pitch circle is rejected. The diameter of this circle is 13 inches, but the limit of variation that any gear can show and pass is only 0.0015 inch.

When successfully past this inspection the gear is ready to be ground on its outside diameter and on the face of the teeth, and this in turn leads to inspection No. 9. Another grinding operation on the back and face of the web and again an inspector must check the accuracy of operator and machine, this time permitting a limit of variation of only 0.0005. The final grinding is the finish of the opening for the differential case, which is followed by inspection No. 11. The last machining operation is the drilling and reaming of the differential casing bolt holes, which, in inspection No. 12, are checked for size and spacing. Absolute conformity to specifications is the standard for this operation, no variation being permitted. Not yet, however, may the gear be released as a finished part, as it may still fail on No. 13, the final inspection. This consists of a test on a special fixture again, for checking the correctness of the tooth-bearing and smoothness of roll, and but little less than perfection is required of the gear that is finally passed through. As a finished product it is obvious that a large percentage of the cost of the gear is due to the continual supervision of the inspector, but it should also be equally obvious that the result is an article as near to the ideal of mechanical perfection as the best of equipment, skill and scientific testing can achieve.

Elianite is a new alloy prepared in the electric furnace, which is particularly resistant to acids. It is not attacked by chlorine or bromide in a free condition, by hydrochloric, sulphuric or nitric acids, or by *aqua regia* made up of three parts of hydrochloric acid to one of nitric acid. The specific gravity of elianite is 6.8 and its melting point is 1,250 degrees Cent.

Induction Motor of New Design

The new line of squirrel cage induction motors built by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., possess a number of noteworthy features of design, including the extensive use of pressed steel in their construction, rotors with cast-on short-circuiting rings and moisture and heat-resisting insulation, dust-proof bearings, etc. The use of pressed steel in motor construction imparts great mechanical strength. The frames of all motors of this type above 20-horsepower in capacity are made of rolled steel, and in the smaller sizes, the end plates, the feet and the slide rails are of rolled steel construction. Above 5-horsepower, the form-wound stator coils are laid in open slots.

The rotor bars are insulated with a special cement which is moisture-resisting and which will withstand a high degree of heat and mechanical stress. In motors above 15-horsepower, the bars are connected electrically and mechanically by casting the short-circuiting rings around their ends. The bearings are protected from dust by a cap on the front end and by felt washers between the metal rings on the pulley end. These motors are built in sizes from 1 to 200-horsepower capacity. In the accompanying illustration, Fig. 1 is a 10-horsepower induction motor and Fig. 2 is a 30-horsepower motor.

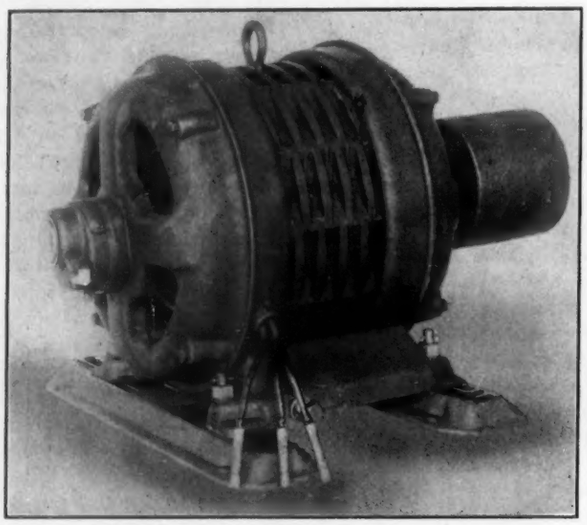


FIG. 1—WESTINGHOUSE INDUCTION MOTOR, 10-HORSEPOWER CAPACITY

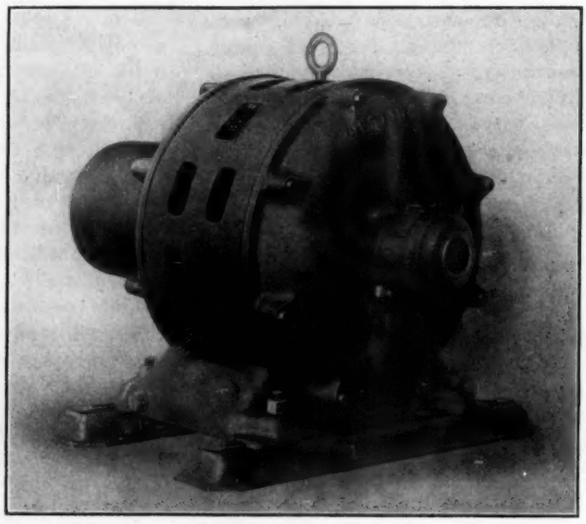


FIG. 2—WESTINGHOUSE INDUCTION MOTOR, 30-HORSEPOWER CAPACITY

The H. W. Johns-Manville Co., New York City, has established a branch office in the Commercial Bank building, Charlotte, N. C. This office is in charge of E. U. Heslop, who is assisted by P. J. McCusker and Paul W. Whitlock.

Grinding Rolls and Other Cylindrical Sections

Description of a New Machine Built by the Norton Grinding Co., Which is Motor-Driven Throughout

A cylindrical grinding machine, particularly designed for grinding rolls for iron and steel mills, now is being built by the Norton Grinding Co., Worcester, Mass. The machine shown in the accompanying illustration, has been installed in the Lorain, O., plant of the National Tube Co. It is designed to swing 54 inches in diameter, will grind work 18 feet in length and has a capacity of 21 feet between centers. While the machine shown is especially equipped for grinding heavy rolls, it can be supplied without this special equipment and then can be employed for grinding plain cylindrical work on centers up to its capacity. The machine is arranged for motor drive only, the equipment being as follows:

One 40-horsepower motor mounted on the wheel carriage for the revolution of the grinding wheel and wheel carriage traverse.

One 14-horsepower motor mounted on the headstock for work revolution.

One 2-horsepower motor on the footstock for traversing the footstock along the ways of the work base.

One 2-horsepower motor on the headstock for traversing the headstock along the ways of the work base.

One 2-horsepower vertical motor upon the wheel carriage for the pump revolution and traversing of the grinding wheel at right angles to the work.

This machine is controlled from one position, the operator standing upon the wheel carriage beside the grinding wheel in such position that he can look directly down between the face of the grinding wheel and the face of the work which is being ground, and can see what is taking place at the point of contact between the grinding wheel and the roll. Standing in this position, the operator can reach all of the hand wheels and levers necessary for starting and stopping the wheel revolution, starting or stopping the roll revolution, reversing the traversing wheel carriage either by hand or by power, moving the wheel carriage for delicate adjustments by hand, moving the wheel to and from the work either by hand or by power, starting or stopping the traverse of the wheel carriage, changing from maximum to minimum speed of the wheel carriage traverse and controlling the amount of water or lubricant flowing over the wheel and work.

The operator uses the upper hand wheel, Fig. 6, for feeding the grinding wheel toward or from the work, one revolution of this hand wheel moving the grinding wheel a distance of 0.04 inch, corresponding to 0.08 inch reduction in diameter of work. If the grinding wheel is to be moved by power, the hand wheel is disengaged by moving the lever at the right of the hand wheel toward the operator and locking the lever in this position. This raises the hand wheel, disengaging it from the wheel feed mechanism and at the same time releases the wheel traverse lever at the lower left hand side. Moving the wheel traverse lever to the right or left operates a clutch, resulting in a movement of the grinding wheel either toward or away from the work. These levers are so constructed that the power traverse cannot be thrown in until the hand wheel has been disengaged; nor can the hand wheel be engaged until the power traverse levers have been thrown out of engagement. The lever at the upper left hand side of the hand wheels controls the stopping, starting and reversing of the wheel carriage. When automatic traverse of the wheel carriage is desired, this lever is placed in its lowest position. With the lever in the next higher position the wheel carriage can be reversed or stopped by hand. With the lever in its upper position it engages the lower hand wheel with the wheel carriage traverse mechanism, permitting the movement of the wheel carriage by hand.

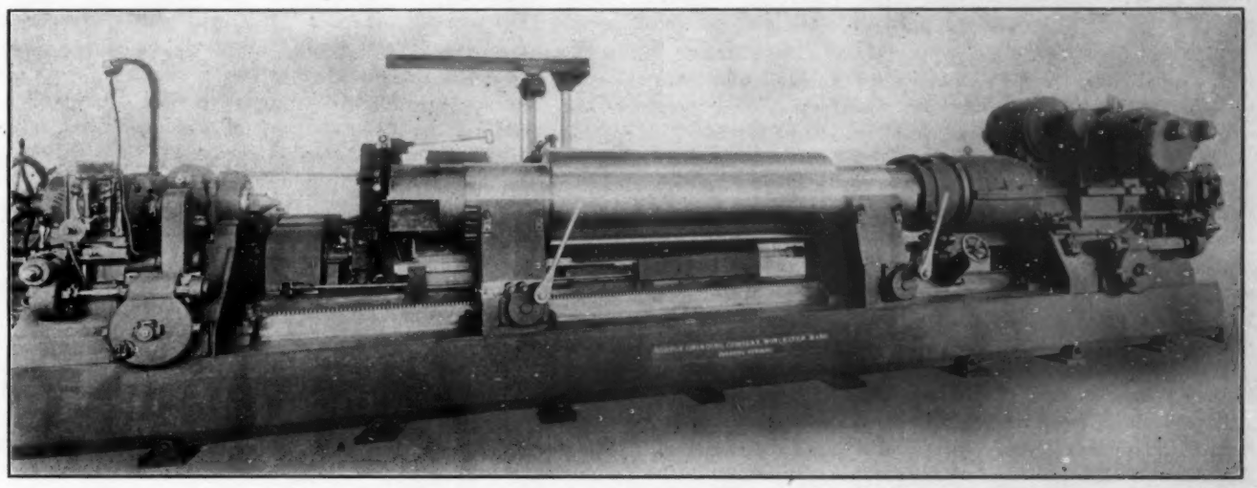


FIG. 1—REAR VIEW OF NORTON CYLINDRICAL GRINDING MACHINE WITH STEEL ROLL IN POSITION FOR GRINDING

The changes in speed of work revolution are accomplished at the headstock with change gears. Intermediate speed changes for the traverse of the wheel carriage are made on the front of this carriage.

As this machine is designed for large work it is imperative that the ways in which the wheel carriage travels, should be perfectly straight, and to obtain straight ways on this machine, the Norton pendulameter is used. This instrument permits the detection of errors as small as 0.001 inch at any point along the ways as

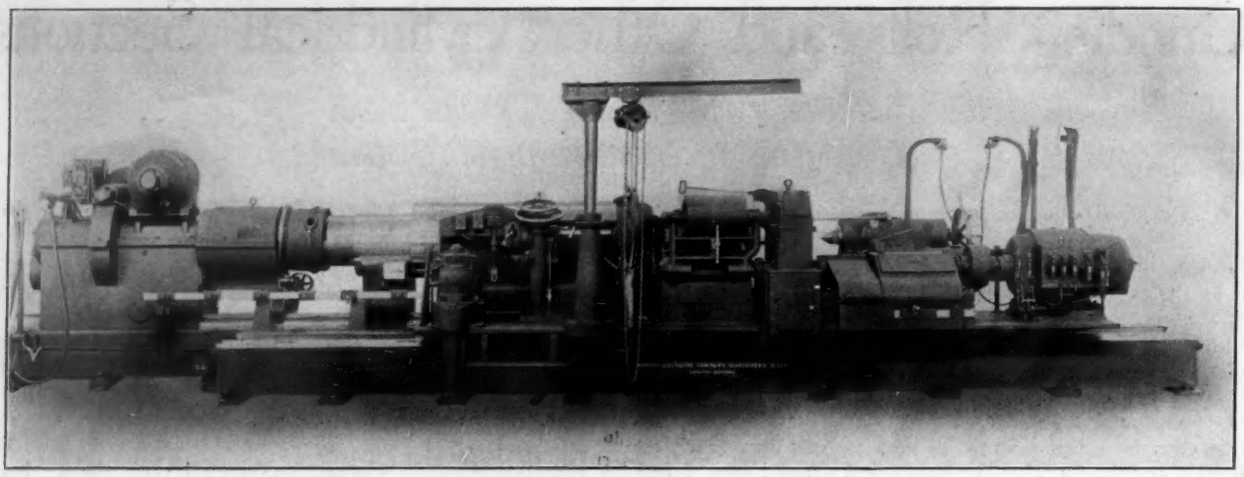


FIG. 2—FRONT VIEW OF MACHINE WITH STEEL ROLL IN POSITION FOR GRINDING

related to parallelism and straightness of the ways. The ways are then scraped to master straight edges until the pendulameter registers a perfectly straight line.

It will be noted from the illustrations that this machine is provided with supporting wedges which are self-contained with the machine and the alignment of the ways can be corrected at any time, but the width and length of the bearing of the wheel carriage on the ways of the base are so ample it is improbable that with the machine once set up and adjusted for correct alignment, that any error can be detected after many years of use.

Many years ago, J. Morton Poole invented the double wheel machine with a swinging frame to secure accurate diameters over the entire length of the roll, for the reason that at that time there were no known methods for producing and maintaining straight ways of sufficient accuracy to secure perfectly straight lines or uniform diameter of roll with a single grinding wheel.

The machine herein described is designed and constructed in accordance with the experience of recent years, namely, that it is wholly practical to produce and maintain ways for a single grinding wheel which will secure absolutely perfect rolls, and incidentally the advantage of this single wheel is that with the present design it is possible to have the wheel large in diameter and of wide face, so mounted and provided with powerful drive as to permit the grinding, in a few hours, of rolls which formerly required a day or days for their grinding.

Further, it is more convenient to place heavy rolls in the machine, or remove them from the machine than is the case with machine equipped with the double wheel.

Under the old system a roughing cut was unknown. All cuts were practically finishing cuts and hours, in fact days, were spent in the slow process of grinding with small wheels, not exceeding 14 or 15 inches in diameter and not over 1 or 2 inches in width, and relatively small spindles and frail supports were provided for the carrying of these wheels. In designing this machine, the two objects in view have been accuracy and large production.

The first roll grinding machine of the type described, was shipped to a well-known steel concern for grinding rolls to be used in the rolling of steel plate. The rolls are of various diameters and lengths, but the largest roll the customer expects to grind on this machine is 34 inches in diameter and 18 feet in length over all, although rolls 54 inches in diameter can be ground if desired.

It will be noted that the machine is equipped with massive pillow blocks and bearings for carrying the rolls upon their necks, the largest of these necks being 24 inches in diameter.

During the demonstration of this machine, rolls were ground in from one-fourth to one-half the time previously required for finishing the same rolls in the lathe. As yet there has not been sufficient time in which to definitely establish the conditions under which the machine will give the greatest output, but there is every reason to expect that greater savings will be shown after the machine has been longer in commission.

The original design of Norton plain grinding machines has been departed from in this case, for the reason that the work to be ground is of such size that in order to see the point

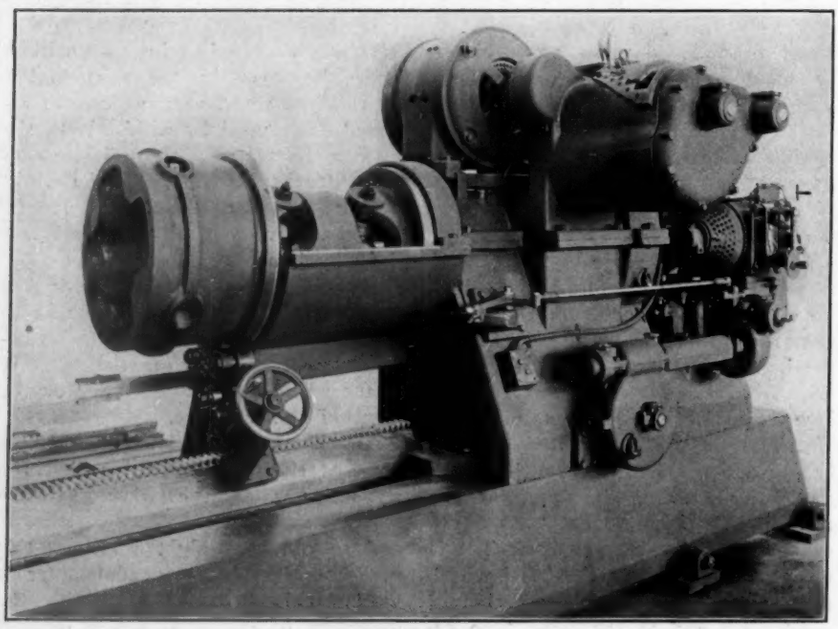


FIG. 3—NEAR VIEW OF THE HEADSTOCK, WITH UNIVERSAL JOINT AND DRIVING SLEEVE

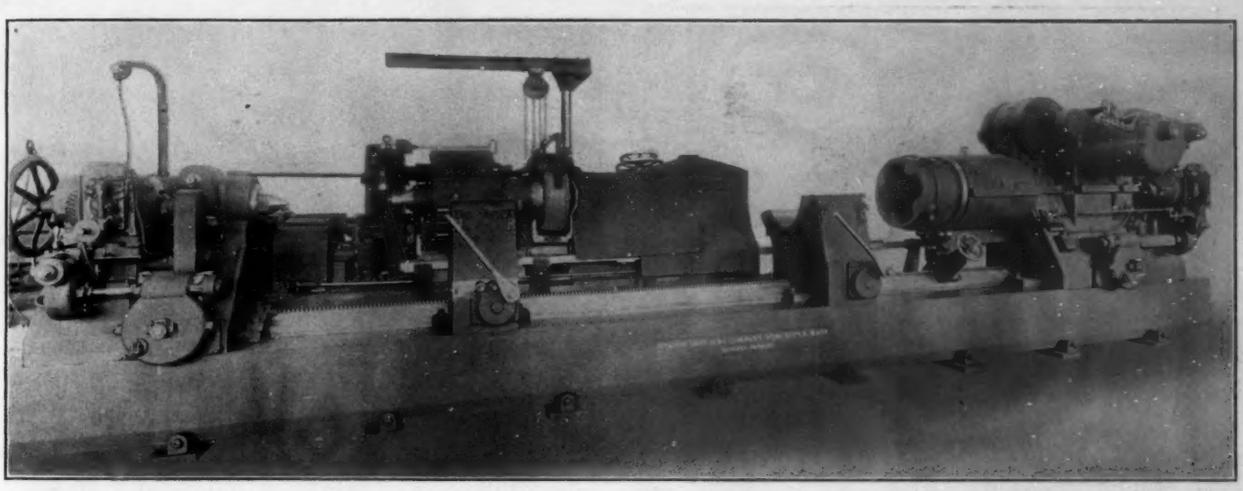


FIG. 4—REAR VIEW OF THE MACHINE, THE STEEL ROLL HAVING BEEN REMOVED FROM THE BEARINGS

of contact between the work and the grinding wheel, it is necessary for the operator to have control of the machine on the same side of the work as the wheel is grinding. He does, however, as in the standard machine, have entire control of all of the important functions of the machine while standing in one position, and without reaching over the work. To secure perfectly smooth work, the rolls are revolved through helical gears and large worm and worm wheels running in a bath of oil. Six speeds of work revolution are provided. The headstock spindle is 12 inches in diameter; the footstock spindle, 10 inches in diameter; the centers are 6 inches in diameter and are interchangeable.

When grinding rolls carried on their necks, they are revolved by means of a large universal joint, in order to give a steady and uniform rotation of the work, one end of the universal joint being bolted to the face plate of the headstock spindle. To the other end is bolted a driving sleeve which clamps solidly to the wabbler end of the roll, revolving as a part of the roll. The driving sleeve and universal joint are made of steel castings.

When grinding work on centers, the universal joint, the universal joint case and the driving sleeve are removed and a driver is bolted direct to the face plate on the headstock spindle.

The wheel head with its spindle, wheel guard, wheel sleeve and wheel, weighs over 5,000 pounds and rests upon a solid wheel head base mounted on the long, heavy traversing wheel carriage, making it possible to grind the roll rapidly.

Provision is made for grinding the necks of the rolls either when carried on the machine centers or when the rolls are revolved upon their necks in specially arranged bearings, and machines can be supplied either with or without the footstock, the footstock not being necessary for grinding the roll necks, it being entirely practicable to grind rolls both on necks and bodies when carried in these specially arranged bearings. The pillow block bearings for use in grinding the necks, are arranged with multiple bronze bearings which are adjustable for the small variation in the size of necks, a pillow block being required for each standard size, the adjustment taking care of the variation from the standard. Perfectly round necks are guaranteed whether or not there are centers in the roll. A trammel is provided for adjusting the roll neck bearings to correct diameter before the roll is placed in position for grinding.

Fillets on the roll necks can be ground with the same wheel and at the same time as the necks are ground. A forming attachment is also furnished, which is adjustable for any radius for the forming of the corner of the grinding wheel when fillets are to be ground. A truing device is also furnished for truing the face of the grinding wheel. The pump delivers about 30 gallons of lubricant per minute on the wheel and work. The castings entering into the construction of the machine contain about 20 per cent steel, giving a close grain casting of good wearing qualities. The wheel spindle is chrome-nickel-vanadium steel, heat-treated to a hardness which gives it extrordinary wearing qualities. The grinding wheel sleeve is a steel casting, as is also the wheel guard, this guard weighing over 600 pounds. The shafts are made of carbon steel and are carefully ground to size. Helical gears in the headstock are of steel, as are also many of

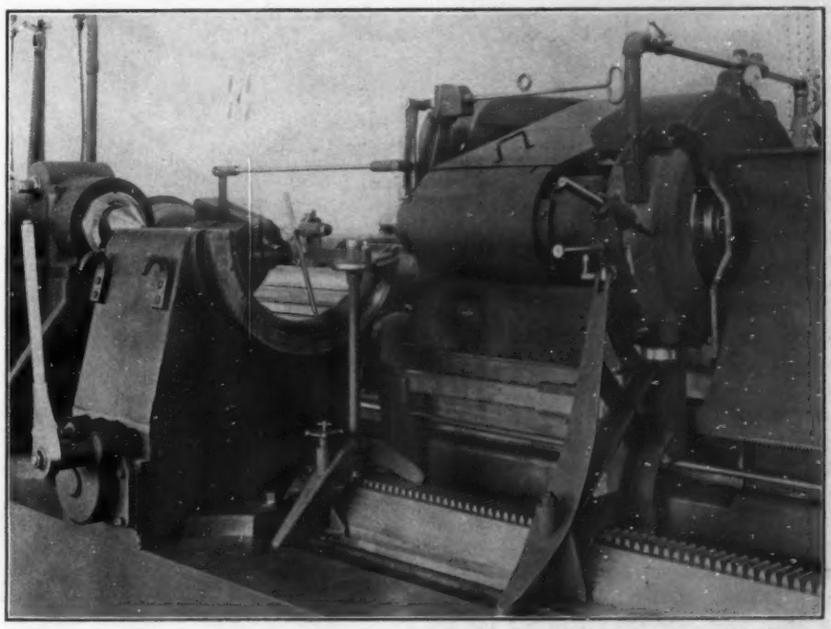


FIG. 5—VIEW OF THE JOURNAL BEARING, JOURNAL RADIUS GAGE AND RADIAL TRUING DEVICE

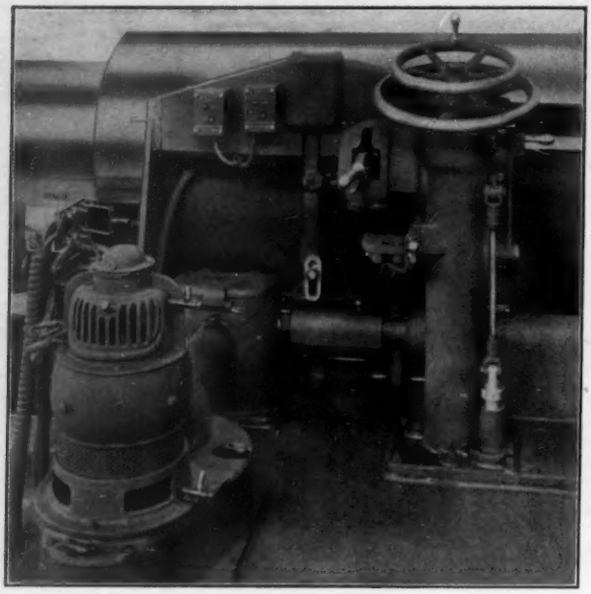


FIG. 6—VIEW OF THE CONTROLLING MECHANISM

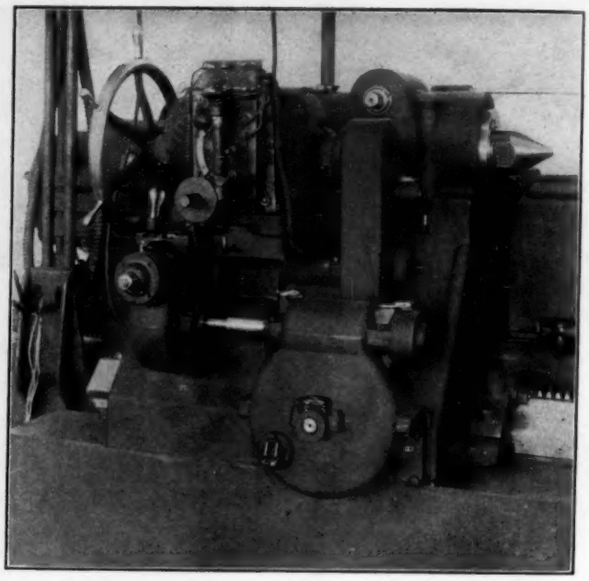


FIG. 7—NEAR VIEW OF THE FOOTSTOCK

the other gears in the machine, where strength and durability are required. All racks are of solid steel. The pillow blocks for roll necks are steel castings, while the adjustable bearings in these pillow blocks are made of bronze. The adjusting wedges under these bronze bearings are of high-carbon steel.

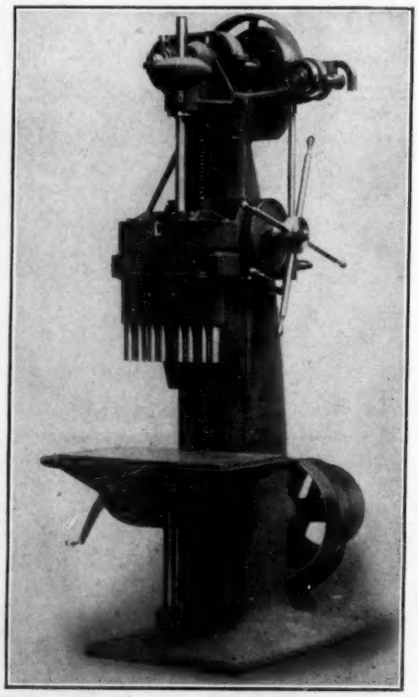
When desired, an attachment can be supplied for this machine, which will permit the grinding of rolls with either a concave or convex face. The machine shown in the illustrations is arranged for grinding rolls, either straight or with straight tapers, whether or not the rolls are carried on centers when being ground. The machine weighs about 100,000 pounds.

Concrete Wall and Column Footings

In a 114-page illustrated bulletin by Arthur N. Talbot, the University of Illinois has published the results of tests to destruction of a large number of full-sized reinforced concrete wall and column footings. The tests give the first experimental data of the action of structural footings of this kind under conditions approximating those which exist in actual structures. The results of the tests are utilized in the discussion of formulas and principles for the design of reinforced concrete wall and column footings. In making the tests, variety was given to the amount and method of reinforcement and to other conditions with a view of determining the structural action with respect to tension, bond, diagonal tension and shear, and to give information which would bear upon methods for the calculation of stresses.

An Eight-Spindle Drilling Machine

An eight-spindle, fixed center drilling machine, built by the Foote-Burt Co., Cleveland, which can be arranged either universally adjustable or adjustable in a straight line only, is shown in the accompanying illustration. This tool was designed for handling automobile work and is being employed for drilling automobile cylinder castings. It is also used for drilling the sides of crank cases and cylinders. The spindles of the machine have large bearings, are bronze bushed and are arranged with No. 4 Morse taper. The driving spindle spur gears are made of 3½ per cent nickel steel and the head slide on the column is extra long to insure rigidity. The machine is provided with friction throw-out back gears. This arrangement is designed to provide for the large range of sizes between the large valve holes and the valve stem guide holes on valve hole work. This drilling machine is driven by a three-step cone pulley and has six changes of power feed, by means of a two-step cone pulley and change feed gears. The automatic knock-off to the power feed also is arranged with a quick traverse by a large pilot spider wheel. The column of the machine is of box section and the table has a large working surface. An oil groove entirely surrounds the table, which is raised and lowered by a jack screw with spiral gearing.



EIGHT-SPINDLE FIXED CENTER DRILLING MACHINE

"Heating and Ventilating a Large Factory" and "Heat Transmission Through Building Walls of Corrugated Iron" are the titles of two articles published by the Green Fuel Economizer Co., Matteawan, N. Y., in a 16-page illustrated pamphlet. The first article describes the hot-blast heating and ventilating outfit utilizing steam, installed in two large concrete and glass buildings, aggregating 2,400,000 cubic feet, of the Lee Tire & Rubber Co., Conshohocken, Pa. Full particulars are given of all data and calculations. The second article describes some tests upon the hot-blast heating equipment of the fan shop of the Green Fuel Economizer Co., which is a steel frame building covered with corrugated iron.

IRON MINING NEWS

Stripping at Balkan Property

Contracts have not yet been awarded for stripping work at the big Balkan property of Pickands, Mather & Co., in the Mastodon district of the Crystal Falls region, notwithstanding bids from various concerns were received several weeks ago. On the contrary, there appears to be doubt whether an open pit will be created or whether the underground system will be adopted exclusively. An exporatory shaft will be sunk, at any event. In the meantime, a steam shovel is excavating a new channel for Mastodon creek, which is to be shifted to a course further away from the prospective mine. At the Judson property, which comprises the other half of the so-called big Mastodon find, active operations preparatory to opening the deposit are in progress. A boiler and engine house, 50 by 125 feet, is being erected by the Foster Construction Co., of Milwaukee; a large boarding house and several dwellings are nearing completion, and the Chicago & North Western is employing a large crew in track extension work. It is expected that shaft sinking will be started about Aug. 1.

New Mine at Negaunee

The work of opening another mine at Negaunee, Marquette range, has been started. The Athens property is the scene of the operations. While Pickands, Mather & Co. have a part interest in the tract, the mine will be developed and wrought by the Cleveland Cliffs Iron Co. It will be many months before production is possible, the ore lying at great depth. Part of the shaft will be concreted. An engine house will be erected this year and, in the spring, a shop building and a combination warehouse and office, all of fireproof material. The headframe at the shaft will be steel. The machinery will be operated by electricity. The Athens will be a big mine, taking rank with the largest producers in the field. Negaunee was the scene of the first discovery of ore in the Lake Superior region, nearly 70 years ago, and mining has been in progress for six decades, yet there is more ore in sight at present than at any previous time in the history of the district. The field is long lived. Further decades will elapse before its deposits are exhausted. A mine scheduled to be added to the producing list next year is the Lucky Star, now being opened by the Breitung interests. As in the Athens, the ore extends to great depth.

Will Strip the Groveland

The Erie Ore Co. plans to strip the Groveland mine, a property in the Randville district of the Menominee range. This company recently succeeded the Groveland Mining Co. in control of the tract. Trenching and other surface exploratory work is under way, with a force of 30 men employed under the direction of Capt. C. M. Grant, lately of Hibbing, Mesabi range. Much of the ore comes close to the surface and is, as is believed will be the case, the open-pit method is found feasible, it is proposed to remove the overburden, break the ore with dynamite and load directly into the cars with a steam shovel, exactly as is the method in vogue at M. A. Hanna & Co.'s Richmond mine on the Marquette range. The Breitung-Kaufman interests of Marquette, which several years ago explored their lands adjoining the Groveland, finding ore that outcropped in places, have as yet made no move to develop their holdings in the Randville district. The ore is not of fancy grade and material of this class, ample for present needs, is now being mined at the Breitung-Kaufman properties on the Marquette range. In time, the Randville property will be developed as an open pit.

Zimmerman Mine Active

The fact that the Spring Valley Iron Co. temporarily suspended operations at the Zimmerman mine led to reports that the property was to be idle the rest of the year, it being said the furnace to which the ore was consigned had found it would be overstocked. However, the mine is in commission again and full shifts of men are at work. Ore lately has gone forward from the James property of the Mineral Mining Co., of Milwaukee, at a lively rate. The shipments from the stock piles, where a steam shovel is at work, have averaged 60 cars daily, and in addition 750 tons daily have been sent direct from the underground workings. It is expected that the ore in stock at both shafts will all be forwarded this season.

Seven-Ton Skips

Two exceptionally large ore skips have been installed by the Steel Corporation at its Pabst mine, Gogebic range. The capacity of each is seven tons. The largest skips heretofore in use in the district are of five-ton capacity. Operating in a new field of the Gogebic range, Duluth interests, headed by R. J. Whiteside and W. G. La Rue, have the development of the Presque Isle mine well under way. The property is on the Presque Isle river, in section 21, township 47, range 23, five miles north of the village of Marenisco. It was explored by diamond drill prior to the institution of development work and a large deposit was found, some of the ore lying less than 300 feet from surface. One of the finest shafts on the range, 6 by 16 feet, with three compartments, has been sunk in solid rock to a depth of 250 feet. A crosscut is now being extended at that point to cut the ore body 600 feet distant. The mine is equipped with two boilers, an air compressor and a hoist. The Presque Isle is the pioneer in a new district and developments there are beng watched with keen interest.

Fast Work at Bengal

Pickands, Mather &Co. have established a record at the Bengal mine at Iron river, Menominee range. Development work started only last fall and the property has now entered the list of shippers. Since the mine eventually will be one of the heaviest producers in the district, it is provided with an expensive equipment. All the buildings are of brick and steel, modern in every respect. The steel head-frame is one of the largest on the range. It is 105 feet high and is provided with a No. 7½ ore crusher. Pickands, Mather & Co. are shipping large tonnages from their Baltic and Caspian mines at Iron River. The Zimmerman property of the Spring Valley Mining Co. also is making a good record in this particular. But little work is in progress in the Michigamme district, at the western end of the Menominee range, although it was expected there would be 200 men employed by this time. Not more than 25 men are at work. The mines in the field are the Ohio and Portland of the Rogers-Brown interests and Imperial of the Cleveland-Cliffs Iron Co.

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Tonnage Makes Profits

Financial reports recently issued by leading iron and steel makers, tend to confirm the statement that the steel industry is now enjoying one of its most profitable earning periods since 1907. The report of the Republic Iron & Steel Co. for the first half of the present year showed a gain in income of approximately $1,800,000, or about 190 per cent, compared with the first quarter of 1912. The net profit for the half year was almost three times that of the corresponding period of 1912. Had it not been for the floods in the middle west, it is believed the total earnings would have reached the high water mark of 1907. The Lackawanna Steel Co. increased its income during the first half of 1913 by more than $2,300,000, or approximately 300 per cent over the same period of 1912. Its net profits for the first half of 1913 were $1,755,195, compared with a deficit of $365,000 for the first half of 1912. The Steel Corporation's report for the second quarter, to be issued this week, is expected to make a very favorable showing.

While the steel industry apparently is now at the crest of the profits being derived from the higher priced contracts taken some months ago, it needs to be pointed out that such net earnings are being made possible only by the enormous tonnage of product turned out. When the steel industry as a whole made its best showing of earnings in the year 1907, it did so with a level of prices that were about $5.00 a ton on the average above that which now prevails. A comparison of the average prices ruling in 1907 and those now current in a number of the leading finished steel products, is interesting. These prices in tons, base Pittsburgh, are as follows:

	1913.	1907.
Steel bars	$28.00	$32.00
Tank plates	29.00	34.00
Structural shapes	29.00	34.00
Bessemer billets	26.50	29.00
Wire nails	34.00	40.00
Tin plate	72.00	78.00
Sheets No. 28 plain	45.00	52.00
Sheets No. 10 blue annealed	35.00	37.00

At the present time, the steel industry is running at the rate of better than 33,000,000 tons of ingots annually. In 1907, it produced 22,500,00 tons. It is apparent that the vast increase of tonage this year has not brought with it a commensurate rise in prices when arrayed against the records of 1907. In fact, it tends to emphasize how conservative has been the attitude of leading steel makers in not asking all that "the traffic would bear" during the recent buying movement, or what they might have been justified in quoting by the actual market conditions prevailing at former periods of comparable demand.

May Learn in Australia

It is announced that Col. Roosevelt has been asked to tour the Australian music hall circuit and give a series of lectures on social subjects. Why the Colonel has been invited to Australia just at this time is not clear. That country has been the center of agitation in which a man of the Roosevelt type might well take a prominent part. But the Australians are showing unmistakable inclination to abandon some of the radical or freakish ideas which have prevailed. A new ministry has been installed and it is helping the people to retrace their steps. One of the first things done by this ministry was to abolish the preference of unionists on public work, and the new premier declared that while the government was making no attack on unionism, it would lay down the principle of public control of service for the commonwealth and provide equality of opportunity for all citizens. Efficiency, he said, would in the future be the only test.

Let us hope that if the Colonel does go to Australia, he will see the folly of some of the ideas which have been carried out in that country,—ideas which in some respect have a striking similarity to planks in the Progressive platform of last year.

Woke Up Too Late

The case of Charles S. Mellen seems to have been one of the man who woke up too late. Mr. Mellen was a man of towering ambition and his predominating idea was absolutely to control the transportation of people on steam and electric railroads, as well as on steamboats in New England. Although a man of much ability and many fine qualities, he was somewhat overbearing and intolerant and had little regard for public opinion until recent years. He did not realize that the people were waking up to an appreciation

of the dangers of a complete monopoly of transportation and he went ahead with his plans until it was too late to check the alienation of the people. Then he started to advertise and large amounts of money was spent in telling the readers of newspapers and magazines what a wonderful power for good the New Haven system had been. These advertisements made little impression, and Mr. Mellen has been forced into retirement.

Howard Elliott, the new president of the New Haven, is said to be a man who knows how to keep in touch with the public. He is just the man needed, and with the very large experience that he has had in railroad affairs, promises to carry on with great success the duties which have devolved upon Mr. Mellen for many years.

Improving Conditions

Financial and political conditions, not directly connected in any way with the iron business but having an important influence upon it, continue to improve.

Now that the Bulgarians are apparently thoroughly whipped, the Balkan situation is becoming nicely straightened out and Europe is relieved of the fear which has long hung over it like a dark cloud that there might be a general European war. The European financial situation is improved, but doubtless at a later date there will be some strain in meeting obligations of the Balkan war. This financial improvement is reflected in this country, where there has been buying on the New York stock exchange for European account.

Fewer fears are entertained in regard to the effects of politics on the market. The tariff discussion drags along monotonously, and of course the country is somewhat impatient. But the Senate is the only deliberative body left, and even if the debate does seem to be drawn out unnecessarily, it is much better to have complete freedom of discussion rather than the arbitrary control exercised by the majority in the House of Representatives. Judging from recent votes on different paragraphs, there is no doubt of the passage of the tariff bill and the country is gradually getting ready to adjust itself to the new conditions. That some industries will suffer severely cannot be doubted, but that many others will not be affected at all is also true.

On the other important measure now before congress, that of the currency, the Democratic members of the House committee on banking and currency have accepted some important amendments which have improved the bill and it is likely that other amendments will be made before the bill is reported, if, indeed, the members find themselves able to agree on a report. Mr. Bulkley, the young congressman from Cleveland, certainly is to be commended for his opposition to the creation of a reserve board made up entirely of politicians appointed by the president. Probably the elimination of this objectionable clause will be necessary to insure the passage of the bill. The Senate, in its deliberative way, is likely to have a great deal to say about the new currency bill, and probably the wishes of the minority senators will have more weight in the case of the currency measure than they are having with the tariff bill.

So, taking it altogether, there is nothing in the present congressional situation to arouse alarm or to prevent business from going steadily ahead during the remainder of the year.

The Need of Steel Cars

In its report on the collission of passenger trains at Stanford, Conn., June 12, the Interstate Commerce Commission declares that modern steel equipment for high speed passenger trains should be installed at the earliest possible time, as recommended in previous reports of this commission, and legislation fixing such a time should be enacted without delay. Of the 236 Pullman cars in use on the New Haven lines, only 24 are of steel.

Our esteemd contemporary, the *Railway Age Gazette,* is not pleased with this part of the report of the commission and says that criticism is due for its superficial treatment of the question of steel cars. It says that the commission calls for mandatory legislation, apparently assuming that to renew 40,000 wooden passenger cars at a cost of half a billion dollars would be as simple a task as to comply with the law which requires the 2,000 wooden mail cars of the country to be replaced with steel cars. The *Gazette* objects to the recommendation that a change be made at the earliest possible time and thinks it cannot too often be repeated that the prevention of collision is the duty which precedes that of ameliorating conditions which follow the collision.

Of course the expression of the commission "at the earliest possible time" does not mean that expenditures for all other kinds of improvements shall cease, but it does mean that steel equipment shall be installed as soon as possible, while keeping in mind the maintenance and improvement of other branches of the service. While all that is possible should be done to prevent collisions, there should be no unnecessary delay in installing such equipment as will minimize the disastrous results of collisions when they do occur.

One thing seems to be clearly established by the visit to this country of Ambassador Henry Lane Wilson, and that is that he is not a fit man to represent the United States anywhere. Wilson had hardly arrived in the United States until he began talking about the mediation plan of the president as being "merely rot" and he has not been slow to criticise the policy of his superior officer. These actions alone are enough to discredit him, to say nothing of reports of numerous acts of indiscretion in Mexico. The Mexican situation is a serious one and only the wisest men should have any connection with it. To become involved in Mexican complications is to be avoided as long as possible, consistent with the honor of this country.

VARIOUS PROBLEMS

To be Solved Before Trying to Make San Francisco a Steel Center.

San Francisco newspapers recently have published articles telling of the extensive improvements and additions contemplated by the Union Iron Works Co., and the development of San Francisco as a rather extensive iron and steel manufacturing center was predicted. In answer to an inquiry from THE IRON TRADE REVIEW, President J. A. McGregor, of the Union Iron Works Co., states that the prospects of making San Francisco more of an iron manufacturing center are rather indefinite. He says:

"Unquestionably there is an abundance of satisfactory iron ore in California, but unfortunately there is an utter absence of coking coal. Probably this could be procured in Alaska. A very thorough investigation of the whole matter will be necessary before determining whether or not the establishment of a steel plant on this coast would be profitable. The cost of bringing the ore and coke together on some suitable location would have to be considered. Also the cost of erecting furnaces and a steel plant, and finally the probable cost of steel products as against the figure at which the finished articles could be laid down here from the east and from foreign countries after the Panama canal is open for traffic. The question of import duty will also have a bearing."

As to importing Indian pig iron, President McGregor says that he is informed by Messrs. Balfour, Guthrie & Co., that they have several lots on the way which they say is of high grade and well spoken of.

As to improvements made by the Union Iron Works Co., President McGregor says that an electric power station has been established. At the present time the company has a steam plant which generates its own electrical current and operates the large air compressors. The plant outlived its usefulness and the company was obliged to buy electrical power from the Pacific Gas & Electric Co. About a year ago, it was decided to abolish the steam plant and a ten-year contract was made with the Pacific Gas & Electric Co. to supply electric power to run the whole plant. With this in view, the company has completed a very handsome building, into which the power company's main wires will lead and in which are located the necessary transformers for reducing the voltage of the current supplied by the main feed wires, also rotary converters, switchboards, etc. Three of the latest type air compressors, each having a capacity of 2,500 cubic of air per minute, were purchased from the Chicago Pneumatic Tool Co. These compressors are direct connected and will be electrically driven. All wooden structures in the plant of the Union Iron Works Co. have been demolished and substantial buildings of steel construction have been substituted. Throughout the plant, all of the machinery has been systematically overhauled and individual electric motor drives are now in service. In order to provide additional berthing space for vessels undergoing repairs, an additional 600-foot wharf was built.

Aside from the above features, the efforts of the company have been confined to a general toning-up and modernizing of the plant, which is now in first-class shape.

BRITISH IRON TRADE

Still Suffers from Strike Effects—Pig Iron Declines.

Office of The Iron Trade Review,
Princes' Chambers, Corporation Street,
Birmingham, Eng., July 19, 1913.

Pig Iron.—Although the Midland strike is completely over, the Midland iron markets are still suffering from its disastrous effects. At the Birmingham meeting on Thursday, there was a further drop all round of two shillings in the selling prices of Northampton and Derbyshire brands, although the makers have been asserting for weeks past that rock bottom prices have been reached. They do not now disguise their anxiety as to the future. Some of them have no orders on their books, and are putting practically all their make into stock, except a little foundry material, which continues to find a moderately good demand. In Derbyshire, the question of blowing out furnaces is being very seriously considered, and unless things change, this step must be taken shortly. The Lincolnshire Pig Iron Association has reduced the official price of No. 3 foundry iron to 57s ($13.94) on trucks, or equal to 69s 9d ($15.36), delivered in Manchester. Derbyshire iron is about 57s ($13.94) per ton. The Cleveland makers are now offering iron at slightly above merchants' rates and forward prices are rising. It is considered that the statistical position is sound, warrants havng been reduced by 10,000 tons during the month, while shipments are over 36,000 tons. Yesterday's quotations were 54s 11d ($13.44) cash and 55s 9d ($15.64) three months. The amount in store is 200,000 tons, representing a slight fall even yesterday. The hematite market, which has shown great strength, is giving way a little, East Coast numbers being 73s ($17.86) for both prompt and forward delivery.

Finished Iron and Steel.—In the Midlands, the finished iron and steel market is still feeling the after effects of the great strike. At the Birmingham meeting on Thursday, great satisfaction was expressed that the strike was at last really out of the way, and, from this point of view, there was a little improvement in tone; but it will be at least a week before either the tube mills or the wagon works make demands on the strip and bar mills. The latter are badly wanting work, but finished prices generally, have not materially altered since Quarter Day, with the exception of galvanized sheets, which can now be bought in large lots at £10 10s per ton. The position is becoming very serious for small makers, whose profits have quite disappeared. The great mills on the coast, who are gradually seizing all the export trade, manage to keep a footing by means of their large production, but the Eastern troubles are still affecting the Welsh markets and making competition keener than ever.

In the tinplate trade, the position continues to get worse, and a state of things is developing which threatens shortly to culminate in a strike. If this should take place, it will be a kind of strike altogether new in the history of the British iron trade. The men have for a long time clamored for the general acceptance throughout the trade of a "stoppage" week, so that production could be regulated, and the depression, whatever it is, could be shared with some approach to equality among the various mills. This, on more than one occasion, has been the subject of a formal representation to the owners of the Welsh mills, but apparently their keenness of competition with each other has prevented the adoption of the "stop-week" policy. The men now threaten to strike to support a demand that the whole of the mills shall be thrown idle one week in every four.

Four Furnaces Operating.—Four of the new open-hearth steel furnaces of the Youngstown Sheet & Tube Co., Youngstown, O., are now in operation, the fourth having been lighted about a week ago. The entire battery, consisting of six furnaces, is expected to be in operation some time next month. The new 44-inch blooming mill, built by the William Tod Co., Youngstown, driven by a large engine, built by the Mesta Machine Co., Pittsburgh, is operating satisfactorily. The new steel plant will have a capacity of 1,000 tons a day.

Installing Taylor System in Connecticut Plant

Rapid Growth of the Baird Machine Co. in Recent Years—History of the Company Extends Back to 1846

Bridgeport, Conn., July 28. — The Baird Machine Co., one of the enterprising concerns recently brought to this city through the activity of the Bridgeport Board of Trade, has commenced to install the "Taylor system" in its new plant here. This does not mean that the company is going to revolutionize its operating policies, as the new system will only be supplementary to the one that has been followed by its management for years.

"Our need for an efficiency system such as we are now installing," said President C. L. Warner to the representative of THE IRON TRADE REVIEW, "originated in the rapid growth of the company in the last few years. In 1908 we had about 35 names on our payroll and now we have 200. I might add that our organization is now about as large as we want it, as a business of the nature ours is must not be too large for economic reasons.

"We have always had a pretty successful system in our plant and that is what we call the 'one-boss' system. That is, each man is responsible to but one 'boss', and that 'boss' in turn has but one man to whom he is responsible. In that way, we always were able to avoid conflict and confusion, which is bound to arise when men are getting instructions from more than one source. There has never been any over-lapping of departments here.

"Then, too, we have always been eager to give recognition to our men when they merited it. In fact, almost every one of the men connected with the management, as well as the foremen, started in at sweeping the floor. They were selected for their present positions solely because of their natural ability and aptitude for the work. As a result of this policy, there has always existed very close co-operation and a spirit of emulation among the employes. They know that the only way to rise is to devote themselves to their work and this knowledge has created such a fine spirit that when we started to install the Taylor system about three weeks ago, it met with a hearty welcome all over the plant.

"In putting in this new system, we are only doing what we have had under contemplation for several years. Our idea is to separate the planning end of the business from the performing end. We are going to make it possible for the men in our shop to put in every minute at actual production—make it unnecessary for them to waste time in studying out what tools to use, locating the tools and materials and all that. We are going to do all the planning for the workman so that all that is left for him is the actual work.

"This planning organization is to consist of the engineering department, which will lay out 'what to do'; the route clerk, who will specify 'where to do it'; the instruction card man, who will figure out 'how to do it'; the production clerk, who will decide on 'when to do it'.

"These four departments will design

C. L. WARNER

and lay out the drawings for the work, decide in what departments various parts of the work shall be done, specify what machines and tools shall be used, what men shall do the work, etc. Then, when the job is ready to be done, the workmen will not have to stand around and wait for anything; for everything will be ready for them to start right in.

"The business in the future will be managed the same as in the past. As president, treasurer and general manager, I will have the entire business, including sales, accounting, purchasing and production departments, in charge. All of these departments, however, are entirely separate—sort of like an organization of sub-contractors. The sales department cannot promise delivery of an order until it gets assurances from the production clerk. The latter will be in charge of the whole planning department. The superintendent is in charge of the whole manufacturing end, both planning, purchasing and performing, and is responsible only to me. The various foremen are responsible to him.

"We expect that it will take us at least three years before we perfect this system. One idea will probably bring on another and we don't know yet what the ultimate system will be. We are looking for very favorable results."

The history of the Baird Machine Co. extends back to 1846, when J. H. Baird, then 19 years old, of Oakville, Conn., went into the business of manufacturing tools, presses and special machinery at Huntington, Conn. In 1850, he discontinued this business and thereafter occupied himself in various business connections until 1880, when he formed the Baird Pin Co. at Oakville. This company was sold out in 1886, and the Waterbury Machine Co. was formed to take possession of the factory. The latter concern took up the manufacture of special machinery and in 1888 Mr. Baird sold out the machine business, engaging in the pattern-making business thereafter for two years. He then took an interest in Henderson Bros., of Waterbury, but in 1891 severed this connection to organize the Baird & Warner Co. with Fred E. Warner. This company designed and built special machinery. In 1892, the Baird & Warner Co. moved to Oakville, and soon after became the Baird Machine Co. Here it expanded very rapidly, and, finding it difficult to secure additional property in Oakville, in 1910 built the large new plant at Bridgeport, which it now occupies.

C. L. Warner recently succeeded Mr. Baird as president. Mr. Warner also occupies the offices of treasurer and general manager. His brother, B. C. Warner, is secretary and superintendent, while Arthur J. Lewis is vice president and designing engineer. Mr. Baird, who is now 86 years of age, still retains his interest in the company and comes from Oakville occasionally to act in an advisory capacity. The company manufactures special automatic machinery for wire

and sheet metal forming of all kinds. The products which these machines turn out are of a wide range and variety, including suspender and belt trimmings, hooks and eyes, corkscrews, tacks, springs, paper clips, pins, hinges, etc. The company also manufactures tool and die grinders, all kinds of presses, and grinding, burnishing, buffing, japanning, drying and other tumbling barrels.

FERRO PRICES

Are Barometer of International Steel Conditions.

It has been said that ferro-manganese, probably more than any other merchant material, serves as an accurate barometer of international conditions in the iron and steel industry.

Why this ferro-alloy reflects so closely the trade situation in the world's iron and steel markets, is quite apparent when it is appreciated that probably no other manufactured iron and steel commodity is so widely purchased by steel makers who otherwise are self-contained upon their requirements of materials that enter into their manufacturing operations. In the United States, as an example, the United States Steel Corporation is the only steel producer that regularly manufactures this alloy. This it does exclusively for its own consumption. The manufacture of ferro-manganese by the Steel Corporation, as has been pointed out, is largely a measure of protection. Since this maker is the heaviest consumer of this material in the world, it is obliged to guard itself against both the possibilities of shortage in supply and of sharp price fluctuations which would probably follow, were it to rely upon the open market. All the independent steel makers of the United States, including many foundries, regularly purchase their requirements from English and German makers.

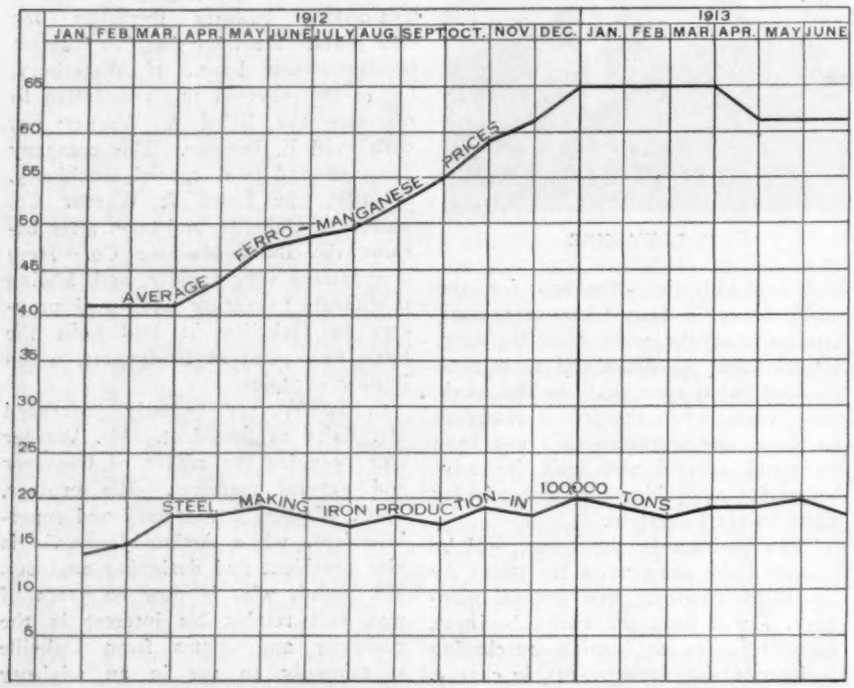
The redutcion in price of $2.50 a ton posted by English and German makers on July 8, is, therefore, accepted as an additional index to a general slowing down of business in the world's iron and steel markets. This reduction was the first price change to be quoted by the makers in three months. The last previous change in the schedules of foreign makers, was announced on April 1, when a reduction of $4 a ton from the high level of the recent advancing movement that had extended from midyear of 1911, was announced. Up to about April 1, of this year, ferro-manganese, selling at $65. a ton, seabord, was at the highest level in more than five years, or since September, 1907, and was $27.50 a ton above the low point of 1911. The $65.00 level had prevailed since December of the previous year.

	Average ferro price.	Steel-making iron output.
January, 1912	$41.00	1,400,000
February	41.00	1,500,000
March	41.00	1,800,000
April	43.50	1,800,000
May	47.50	1,900,000
June	48.50	1,800,000
July	49.50	1,700,000
August	52.00	1,800,000
September	55.00	1,700,000
October	59.00	1,900,000
November	61.00	1,800,000
December	65.00	2,000,000
January, 1913	65.00	1,900,000
February	65.00	1,800,000
March	65.00	1,900,000
April	61.00	1,900,000
May	61.00	2,000,000
June	61.00	1,800,000
July	58.50	

The monthly contract prices of ferro-manganese, f. o. b. eastern seaboard ports, since Jan. 1, 1912, and the dates when price changes went into effect, are given in the accompanying table. In a parallel column is given the monthly record of the production of non-merchant pig iron in the United States, this constituting the make for their own consumption by the steel companies with blast furnaces. The close relation of the prices of ferro-manganese with the production activities of the steel companies, will be observed.

The date upon which changes in ferro-manganese prices have occurred during the past 18 months, and the quotations at these times are as follows:

January, 1912	$41.00
April 15, 1912	43.50
April 27, 1912	46.00
May 10, 1912	48.50
July 24, 1912	51.00
Aug. 23, 1912	53.50
Sept. 9, 1912	56.50
Oct. 7, 1912	61.00
Nov. 29, 1912	65.00
April 1, 1913	61.00
July 8, 1913	58.50



PRICES OF FERRO-MANGANESE AND PRODUCTION OF STEEL MAKING PIG IRON.

Ashland Steel Co. Makes Changes

A shut-down of four weeks for the rod mill of the Ashland Steel Co., Ashland, Ky., has just begun. The steel mill will continue to operate through this period. The cause of the shut-down is the installation of a Cooper compound condensing engine in the rod mill.

A considerable number of changes have been made at the plant in recent months, designed to give greater efficiency. The capacity of the rod mill will be increased 25 per cent by the changes there. New cranes have been placed in service to handle materials better and condensing engines have replaced the former type.

Cut Coke Rate

Tariffs filed with the Interstate Commerce Commission July 28 voluntarily reduce the coke carrying rate from the Connellsville regions to Steubenville and Martins Ferry, O., from $1.30 to $1.20. No reduction is made in the rate to Wheeling, W. Va.

It is considered remarkable the Wheeling rate has been left unchanged. The new rates are effective Aug. 1, when rates on coke tariffs ordered reduced in the Coke Producers' case will become effective. The new Steubenville and Martin's Ferry rate is the same as the new rate to Youngstown from Connellsville.

MEN OF THE IRON TRADE

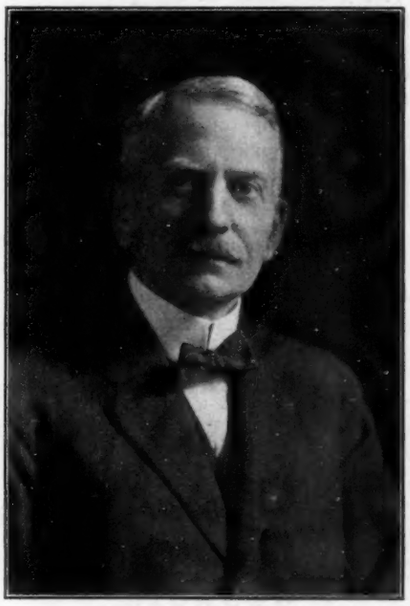
The recent death of E. Y. Smith, who had been president of the Michigan Bolt & Nut Works for about 25 years, has led to some changes in the executive officers, who are now as follows:

LEVI L. BARBOUR, president, is a prominent attorney of many years' practice. As was the case with Mr. Swift, he is not very actively identified with the every-day management of the business. He first became associated with the company in 1910, when, on the death of E. T. Gilbert, who had been vice president, treasurer and general manager for many years, he was elected a director and made vice president. Outside of the legal profession he has been well known as a regent of the State University and for his gift of the Barbour gymnasium to that institution. Nationally he has been well known for many years for his interest in prison reform work.

FRANK S. BIGLER, vice president and general manager, came to the company 26 years ago. He was its traveling representative for 10 years and was then elected secretary, which position he filled for another 10 years, when he resigned in 1907 to go with The Upson Nut Co., Cleveland. There he remained until, on the death of Mr. Gilbert, the old company engaged him to return as general manager. On the advancement of Mr. Barbour to the presidency, he has been made vice president.

HECTOR MACLEAN, secretary and treasurer, came to the company in 1895. He succeeded Mr. Bigler as secretary in 1907, and, on the death of Mr. Gilbert in 1910, was elected treasurer also.

LOUIS E. BOOTH, formerly assistant superintendent of the American Steel & Wire Co.'s north works at Worcester, Mass., and



FRANK S. BIGLER

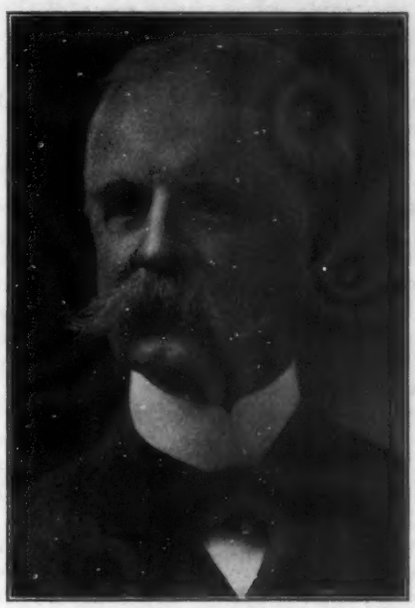
for the last three years located at the New Haven plant of the company has been appointed superintendent of the company's works at Lincoln, Ill.

F. H. EATON, president of the American Car & Foundry Co., has resigned as a director of the International Motor Co. Thomas Cochran Jr. is his successor.

SIR WILLIAM MACKENZIE, president of the Canadian Northern railway, has sailed for England.

E. F. LAKE, consulting metallurgist, has removed from Bayonné, N. J., to 1453 Waterloo street, Detroit.

G. W. FORD, of the Cleveland Planer



LEVI L. BARBOUR

Works, Cleveland, has sailed for an extended European business trip.

FRANCIS FRANCIS, who recently resigned as superintendent of the Chester Steel Casting Co.'s plant, will sail shortly for Europe.

W. A. MILLER, of the Joseph T. Ryerson Co., has been transferred from the Pittsburgh office to the Chicago office, where he will represent the mill department.

SAMUEL T. GREAVES has been appointed superintendent of the foundry of the Vanadium Metals Co., Pittsburgh. He was formerly with the company at Groton, Conn.

J. MILES JORDAN, foreman of the Roberts Winner Foundry, Doylestown, Pa., accompanied by his family, is making an extensive vacation tour about Niagara Falls.

C. E. DEWEY has been appointed freight traffic manager of the Grand Trunk railway system for Montreal, and A. E. Rosevear, general freight agent of the Grand Trunk Pacific.

GEORGE R. WADSWORTH, formerly managing engineer of the Peerless Motor Car Co., Cleveland, has been appointed assistant to the president of Gray & Davis, Inc., Boston.

GEORGE THOMAS has been appointed assistant master car builder for the Indiana Harbor Belt railroad, with headquarters at Englewood, Ill., this appointment being effective July 15.

ALBA B. JOHNSON, president of the Baldwin Locomotive Works, sailed on July 22 for Europe on the Mauretania. This is Mr. Johnson's annual trip, which is taken primarily as a vacation.

J. B. ANDREWS, president of the Andrews Steel Co. and vice president of the Newport Rolling Mills, both of Newport, Ky., has gone to his summer home in Oden, Mich., for a stay of six weeks.

JOHN S. LANGWILL has been appointed superintendent of the Rockford Drilling Machine Co., Rockford, Ill.

F. B. SMITH will act as direct factory representative in the Cleveland district for the Bullard Machine Tool Co., Bridgeport, Conn., with headquarters with the Motch & Merryweather Machinery Co.

H. F. BANFIELD, manager of the Pittsburgh office of the National Roll & Foundry Co., Farmers Bank building, is now engaged in the manufacture of brick at Ironton, O. He is succeeded by A. J. Baird.

W. C. REDFIELD, secretary of commerce, spoke before the Pittsburgh Chamber of Commerce recently. While in Pittsburgh he inspected property to be offered for the enlargement of the United States Bureau of Mines.

WILLIAM SLEICHER has been elected president of the West Side Foundry Co., Troy, N. Y. Other officers are Ralph H. Sleicher, vice president; Charles A. Sleicher, treasurer and general manager; R. A. Stevens, secretary.

H. C. WHITNEY, for several years general southern representative of the American Locomotive Co., and more recently connected with the Atlanta branch of the Locomobile Co., has accepted the position of southern district manager of the Lozier Motor Co.

L. R. PALMER, of Pittsburgh, who for several years was safety expert of the Jones & Laughlin Steel Co., has been appointed chief of the state bureau of factory inspection. He will receive a salary of $5,000 a year and will be in charge of the factory in-

HECTOR MACLEAN

spection work throughout the state. Mr. Palmer is a graduate of Princeton university, where he received two degrees. He is secretary of the American Association of Electrical experts and has frequently made studies of safety devices and their operation.

NEW BUSINESS

A more optimistic tone prevails in machinery business, general sentiment controlled by prevailing conditions indicating that an increasing volume of substantial orders may be developed from now on, despite the fact that August is usually a dull month. The hesitancy evident among the large buyers for the past two months is gradually disappearing, and despite the belief that many large inquiries, now old, will hang over until fall, the actual needs of going concerns will provide an activity unusual for the vacation season. Local conditions are producing a noticeable effect upon some of the large centers of machinery business.

In New York, machinery business continues light. No additional lists have come out, but scattered inquiries hold to the improvement noted last week. The trade is informed that the Virginia Polytechnic Institute, Blacksburg, Va., will take definite action, Aug. 1, on bids for supplying machine tools amounting to about $50,000. Some dealers in the local trade are doing a fair business in second hand equipment.

In Chicago and other western centers the machinery trade is reflecting the improved sentiment evident in the iron and steel markets. New construction, however, just at present is at a low ebb, owing to the fact that most of the projects started earlier this year have been completed, while the recent industrial hesitancy has made manufacturers slow about going into new propositions. The replacement of worn out equipment, sales of single tools and some second hand business constitute the bulk of activity. The president of the Chicago & Northwestern Railway Co. has officially denied the report that this system expects to build a large car plant at Waukegan.

In Pittsburgh, machine tool dealers continue to experience a quiet period, although inquiries the last few days have been considerably better and demand for wood-working tools is especially good. Dealers believe, however, that many of the pending transactions will be held up until the close of the present vacation season. Builders of heavy rolling mill machinery are busily engaged filling orders on their books, but have not been taking much new business.

In Cleveland, several orders unusually large for this season of the year, coupled with a fair run of scattered business in the way of individual tools, gave a favorable volume for the past week. New inquiries are not picking up to any noticeable extent, but there appears to be a general inclination to close on many of the requirements that have been before the trade for weeks and in some cases months. The American Steel & Wire list, which was made out nearly a year ago, and formally submitted for bids last April, has received no final action. Operating industrial plants are furnishing the bulk of business. Railroads are quiet. Demand continues for supplies and second hand machinery, with an unusual amount of the latter being offered. A slight lull in demand for electrical equipment.

In Cincinnati the machinery market is very unsettled. Because of the fact that the iron molders are now on a strike and also because of the condition of unrest that exists here at the present time some of the Cincinnati machine shops have closed down and others are only running half time. Unless the situation is changed here within the next 10 days the majority of machine shops will probably discontinue operation. Second hand machinery business is apparently a little better but is not yet satisfactory. Electric equipment, especially the smaller sort, is in fair demand but hardly as good as it was a year ago.

CALIFORNIA

LONG BEACH.—The Pacific Iron Mfg. Co. has awarded a contract for building the first unit of its plant here to the Long Beach Improvement Co.

LONG BEACH.—The Southern California Edison Electric Co. has been granted a building permit, authorizing an expenditure of $288,000 for the housing of a third and proposed fourth units of its local plant.

LOS ANGELES.—The Llewellyn Iron Works has received the contract for 16 elevators to be installed in the new Broadway department store building.

SAN FRANCISCO.—The railroad commission has authorized the San Joaquin Light & Power Co. to issue $1,776,000 in bonds. The proceeds from the sale of these bonds will be used in connection with the corporation's new hydro-electric plant.

STOCKTON.—The A. L. Young Machinery Co.'s plant was badly damaged by fire recently.

CONNECTICUT

BRIDGEPORT.—The Standard Mfg. Co. some months ago added to its business the manufacture of fire escapes and ornamental structural iron work. It has already turned out in the neighborhood of 50 fire escapes.

MIDDLETOWN.—The Franklin Electric Co., of Hartford, has purchased two buildings formerly occupied by the Leeds & Catlin Co. The buyer will make extensive improvements and additions to the property and remove its plants from Pittsburgh and Newark, N. J., to Middletown about Jan. 1, 1914.

DELAWARE

DOVER.—The American Motors Co., Baltimore, Md., was recently incorporated under the laws of Delaware with a capital of $500,000.

DOVER.—The Latrobe Automobile Turntable & Jack Co., Pittsburgh, was recently incorporated under the laws of Delaware, with a capital of $100,000. Clarence J. Jacobs, of Pittsburgh, chief incorporator.

WILMINGTON.—The Westchester Engine Co. has been incorporated; $225,000; by F. D. Buck, M. L. Horty and G. W. Dillman.

WILMINGTON.—The Automatic Computing & Invoicing Machine Co., was recently incorporated under the laws of Delaware, with a capital of $1,000,000.

WILMINGTON.—The Fort Vacuum Cleaner Co. was recently incorporated with a capital of $100,000. J. Reichard, Wilmington, chief incorporator.

DISTRICT OF COLUMBIA

WASHINGTON.—The Federal Cycle Co. has been incorporated to manufacture motorcycles; $25,000; by T. D. Harper, J. H. Miller, R. L. Miller, W. F. Wynkoop and J. L. Bryan, all of Washington.

WASHINGTON.—Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, until Aug. 9 for metal weather strips needed at the naval hospitals at Chelsea, Mass., Porthmouth, N. H., and Newport, R. I. Estimated cost $4,000. Specifications with H. R. Stanford, chief of bureau.

GEORGIA

COLUMBUS.—The Covington Machine Co., of Headland, Ala., is planning to establish an assembling plant in this city, in connection with the plant of the Columbus Iron Works Co.

IDAHO

POCATELLO.—The Short Line machine shops will probably be enlarged within a short time.

ILLINOIS

CHAMPAIGN.—The Burr Co. has completed and moved into its new foundry.

CHICAGO.—The Harbeck Motors Co. has changed its name to the Leon Victor Engine Co. and increased its capital stock from $50,000 to $250,000.

GALVA.—The capital stock of the Hays Pump & Planter Co. has been increased from $200,000 to $750,000.

INDIANA

ANDERSON.—The Insurance Machine Sales Co. has contracted with the Travelers' Insurance Machine Co., of Louisville, Ky., for the manufacture and distribution of an automatic vending machine, and will build a plant. Ernest L. Baker is general manager.

BLUFFTON.—L. A. Williams, auditor of Wells county, will open bids Aug. 5 for 11 bridges in this county, complete plans for which are on file at his office.

BOONVILLE.—The contract for 40 steel bridges to be erected in Warrick county has ben let by the commissioners to the Vincennes Bridge Co., Vincennes, Ind.

FT. WAYNE.—The Hiser Electric Light & Power Co. has been incorporated; public utility; $5,000; by G. D. Hiser, R. S. Bradley and J. Hiser.

HAMMOND.—The Baldwin Locomotive Co. has taken out a building permit for a building of the first unit of its new plant here, which is expected to cost approximately $500,000. The building is to be 572 x 1,142 feet. 85 feet in height. A. S. Woodle, Philadelphia, resident engineer for the company, has taken personal charge of the construction.

HUNTINGTON.—The Huntington Machine & Foundry Co. has increased its capital from $125,000 to $140,000.

INDIANAPOLIS.—The Ideal Brass Works has been incorporated to deal in metals; $10,000; by E. F. McCoy, E. M. Adams and D. L. Stone.

NEWCASTLE.—The United Motor Co. has been dissolved.

RICHMOND.—Bids will be opened Aug. 6 for a bridge in this county. L. S. Bowman, auditor Wayne county.

IOWA

DAVENPORT.—The Anderson Automatic Engine Co. recently purchased the plant of the Killing Molding Machine Co., of 231 Clark street, which has been idle since Sept. 1, 1912, and will manufacture gasoline engines and motor section cars after Aug. 1. The new company is capitalized at $50,000, and the directors include C. C. Anderson, E. I. Anderson, W. Campbell and H. S. Kratzinger of St. Joseph, Mo., and W. J. Danihy, Mount Pleasant, Ia.

KANSAS

TOPEKA.—The Santa Fe recently awarded the contract for the foundations of its new 150-foot addition to the locomotive machine shops. This extention will give the locomotive shop building a total length of 900 feet. The structural steel contract was awarded some time ago. The Santa Fe only recently awarded contracts for an additional power house in connection with its shops here, and an additional passenger coach shop, to cost $40,000 and a water service building to cost $70,000 are being considered.

WICHITA.—The county commissioners are planning to repair and build 77 bridges throughout the county, bids for which will be called for soon.

WICHITA.—Work has started on the new $80,000 building for the Emerson-Brantingham Co., Rockford, Ill., at Wichita and English streets. The building will be 80 x 100 feet, five stories.

KENTUCKY

CLOVERPORT.—The plant of the Cloverport Foundry & Machine Co. was destroyed by fire recently. The loss was $10,000. Members of the company plan to rebuild.

FLEMINGSBURG.—Machine tools will be needed by the Collins-Morton Co., which has been formed to operate an automobile repair shop.

LOUISVILLE.—The Puritan Cordage Mills, Inc., has decided on a 25 per cent increase in the capacity of its plant. Charles T. Wolfe is president.

LOUISVILLE.—The American Boiler Wks. is equipping a machine shop. Most of the tools have been purchased. C. H. Gerrard is head of the concern.

LOUISVILLE.—Conveying machinery will be needed for the grain elevator of E. G. Duckwall & Co. Construction of the building has begun.

PADUCAH.—The Paducah Traction Co. will require machine tools and woodworking equipment for a repair shop which it is planning to build.

PADUCAH.—The Illinois Central railway is planning to double the capacity of its repair shops. Details may be had at the general offices in Chicago.

MASSACHUSETTS

GARDNER. — The Heywood Bros. & Wakefield Co., Gardner, has awarded the Sullivan & McNally Co., Paterson, N. J., contracts for the erection of two new buildings. One of the new structures will be 16 x 200 feet, four stories, and the other 60 x 160 feet, four stories.

PITTSFIELD.—The General Electric Co. is placing contracts for the construction of a large extension to its plant here. Levering & Gerrigues, New York City, will supply the steel work.

MICHIGAN

CADILLAC.—The Cadillac veneer plant has closed down to enable the company to install additional machinery.

DETROIT.—The Maxwell Motor Co., Inc., advises it is making large machinery additions to its Dayton and Newcastle, Ind., plants. It also is laying out its Detroit plants for an output of 500 automobiles a day.

DETROIT.—The Winkley Co., manufacturer of oiling devices, has recently taken over the spring bolt and automatic grease cup department of the Penberthy Inector Co.

DETROIT.—The Auto Crank Shaft Co., 192 Piquette avenue, has just completed an addition to its factory, 50 x 175 feet, and is installing additional crank shaft machinery which will increase its output 50 per cent.

DETROIT.—The Roehm & Davison Co. has completed its new warehouse on Beaufait avenue. The building is 155 x 212 feet, one story, and will be used for receiving, cutting, storing and shipping the iron and steel products handled by the firm.

EATON RAPIDS.—The Eaton Rapids iron plant has banked its fires for an indefinite time.

ESCANABA.—The C. Reiss Coal Co. has started work on a 300-foot extension to its docks here. Two new steel bridges for the distribution of coal will also be erected.

FLINT.—It is reported that the Durant-Dort Carriage Co. is contemplating entering the automobile field with a low-priced car.

GRAND RAPIDS.—As the result of a special election a water works system will be provided for East Grand Rapids. Bonds in the sum of $25,000 will be issued.

GRAND RAPIDS.—The Grand Rapids Forging & Iron Co., recently organized, has completed its new factory building and started operation.

GRAND RAPIDS.—The Adolph Lietelt Iron Works has received several large contracts recently, including the installation of a complete power plant and heating system for the Belding Brothers building at Belding.

PONTIAC.—Much of the machinery of the plant of the Studebaker body plant in the old Taylor building here is being shipped to South Bend, Ind., where the Studebaker company will henceforth manufacture the products formerly made in Pontiac. Operations will be continued here through August.

SAGINAW.—The American Cash Register Co., Columbus, O., is planning to locate here, and is having plans for a new plant prepared by Architect W. T. Cooper.

SAGINAW.—The Saginaw Wood Products Co. is considering a proposition to locate in Gaylord, Mich. The large plant of the Gaylord Motor Car Co. has been suggested for its use.

MINNESOTA

DULUTH.—The Minnesota Radiator Co., a reorganization of the Northwest Radiator Co., of Sauk Center, Minn., has obtained a building site at the foot of Center avenue, and will erect a plant, 75 x 200 feet, at an estimated cost of $75,000 within a short time. Dr. E. M. Rastell, secretary.

MISSOURI

KANSAS CITY.—The City Boiler & Machine Co. has been incorporated; $17,500; by G. P. Snyder, J. J. Snyder and N. B. Snyder.

ST. LOUIS.—The Inland Machine Works has been incorporated; $8,000; by J. Flamming, P. Schwarz and P. J. Flamming.

ST. LOUIS.—The St. Louis Screw Co. has increased its capital stock from $200,000 to $500,000.

ST. LOUIS.—The John Hill Construction Co. has started work on the erection of a nine-story hotel at the corner of Eleventh and Pine streets, to be occupied by the Majestic Hotel Co.

ST. LOUIS.—A. D. Branham, 318 North Fourth street, and others are planning to erect a $100,000 plant for the manufacture of a patented automatic fare-registering device for use on street cars.

ST. LOUIS.—The Missouri Electric Railroad Co. is reconstructing the double tracks of its St. Charles car lines, operated by the United Railways Co., from the limits of St. Louis on Easton avenue for more than a mile west, using a heavy T-rail with interlocking joints.

MONTANA

GLASGOW.—City contemplating addition of equipment for municipal electric light and power plant. A. T. Melvin, city electrician.

LAVING.—Griggs Bros., St. Paul, grain merchants who have holdings in Musselshell county aggregating 12,000 acres, announces proposed construction of irrigation project to cost about $300,000. Involves utilization of natural reservoir site not far from Shawmut and the construction of canal 10 miles long to catch flood waters of Musselshell river.

RUSSELLVILLE.—The Russellville Iron Works has been purchased by James P. and Thomas F. Hoye, the latter to become business manager. In addition to operating a foundry and machine shop, the new owners will install a line of mining supplies and machinery.

NEW JERSEY

ELIZABETH.—The Diehl Mfg. Co. will start work soon on a new building on Newark avenue. The building will be 60 x 250 feet, three stories, and is estimated to cost $50,000, Day & Zimmerman, Philadelphia, architects.

HAMMONTON.—The contract for the erection of the big sewage disposal plant was recently awarded to the Atlantic Construction Co., Atlantic City, on a bid of $21,000. The contract for the laying of 11 miles of sewers, went to the Cantrell Construction Co., Philadelphia, on a bid of $53,556.11.

NEWARK.—The Whitehead & Hoag Co. will erect a new factory building at Sussex avenue and First street, 150 x 204 feet, five stories.

RAHWAY.—The blacksmith and machine shops of the Keystone Construction Co., of Philadelphia, were damaged by a recent fire that destroyed nearly $150,000 worth of property in the business section of this town.

TRENTON.—A new three-story brick and steel addition is being added to the Mercer hospital. The work will cost $12,000. Contractors L. Levy & Son are doing the work.

TRENTON.—Charles Shick, who recently disposed of his property on West Front street to the state of New Jersey, will shortly erect a new building on West Hanover street for his iron and steel business. The new structure will be three stories high on a lot 50 x 118 feet.

NEW YORK

AUBURN.—The Auburn Iron Co., recently incorporated with a capital of $5,000 to $25,000, advises that it is engaged in the business of handling scrap irons, metals and other waste material. The company formerly rented a plant but recently its expanding business has compelled it to purchase a large storehouse 75 x 100 feet, two stories, with 400 feet of vacant land adjoining for its business. The scrap metals will be stored, sheared and shipped in this yard. E. H. Heerling is president.

BROOKLYN.—A factory site at First avenue and Fifty-fourth street has been sold to the Permutit Co., Wilmington, Del. Plans are being prepared for a plant and construction will probably be started during the next few months.

BUFFALO.—The Delaven Foundry Co.,

Inc., has been incorporated to operate an iron and steel foundry; $10,000; by Joseph N. Percha, Louisa Percha, William J. Wark and Jane M. Wark, all of Buffalo.

ELMIRA.—Plans have been prepared by F. J. Nies, Hoboken, N. J., for a boiler house for the Delaware, Lackawanna & Western Railroad Co. at Elmira. The building will be 45 x 69 feet, one story.

ELMIRA.—The Morrow Mfg. Co. has let contracts for the new heat treatment building to be erected at its plant in Elmira. The Compton Realty & Construction Co. was awarded the general contract for erecting the building, and the Lane Bridge Co., Painted Park, N. Y., will supply the structural material.

NEW YORK CITY.—Lee & Hewitt, architects, 1123 Broadway, are preparing plans for a silk mill to be erected in Yonkers, N. Y., for Ludwig Lithaner.

NEW YORK CITY.—The New York, New Haven & Hartford railroad has decided to equip all of its locomotives with superheaters, which will cost in the neighborhood of $1,000,000.

NEW YORK CITY.—The American Iron Products Co., Inc., has been incorporated; $25,000; by Alfred I. Laing, 64 Fairview avenue, Plainfield, N. J.; Charles H. Williams and B. McManus, both of 95 William street, New York City.

NEW YORK CITY.—The Willys-Overland Co., Toledo, O., has leased some property from Henry Lewis Morris, who will erect a two-story fireproof building to be occupied by the manufacturing company as a factory and service station. The site covers the entire block bounded by 150th street, Gerad and River avenues and the Harlem river. Frederick Putnam Platt, architect, 1143 Broadway, will prepare plans.

ONEIDA.—The Oneida Steel Pulley Co. is planning to erect an addition to its plant.

WEBSTER.—Wooster & Mott, manufacturers of farm implements, are planning an addition to their plant.

OHIO

AKRON.—The Akron Gear & Engineering Co. has increased its capital from $20,000 to $50,000.

CANTON.—Bids will be opened Aug. 15 for the construction of several bridges. J. H. McConnell, auditor. Bids for other bridges will be opened Aug. 20.

CINCINNATI.—The Cincinnati Vending Machine Co. has been incorporated to manufacture slot machines and coin-vending machines; $25,000; by B. A. Tackett, F. Cook, D. C. Outcalt, J. Lemkuhl and C. T. Ryan.

CINCINNATI. — The Cincinnati Woven Wire Fence Co. has been incorporated to manufacture fencing, gates, wire and iron goods; $2,500; by W. K. Sibbald, W. D. Murphy, A. W. Heckerman, E. F. Kummre and D. E. Bradley.

CLEVELAND.—The American Sherardizing Co. has been incorporated; $10,000; by J. S. Campbell, B. P. B. Test, W. H. Dornback, A. W. West and B. F. Dimm.

CLEVELAND.—Bids will soon be called to construct bridges in various parts of Ohio, including Dayton, Canton, Zanesville, Urbana, Hamilton and Marietta.

CLEVELAND.—Bids will be received until Aug. 11 for miscellaneous steel work for the municipal electric light plant. W. J. Springborn, director of public service.

CLEVELAND.—The city council has voted to issue bonds in the sum of $150,000, to provide funds for building a bridge across Morgana avenue on East Sixty-fifth street. R. E. Collins, city clerk.

CLEVELAND.—The E. V. Stacy Electric Co. has been incorporated; electrical goods and appliances; $10,000; by E. R. Stacy, E. V. Stacy, L. E. Fox, O. J. Horn and L. E. Skeel.

CLEVELAND.—City Engineer Hoffman has approved plans for two bridges to be built across the Cuyahoga river near the harbor mouth. Both will be of the elevator type, high enough at their normal position for tugs to pass under. One will be for the Pennsylvania and the other for the Lake Shore railroad. Both will have a 200-foot span, the full width of the channel.

CONNELLSVILLE.—Bids will be opened Aug. 11 for the repair and construction of several bridges in Morgan county. J. E. Patterson, auditor.

DAYTON.—Pinnee & Daniels, wheel manufacturers, are planning to construct a factory building at the intersection of the Big Four railroad tracks and Miami Chapel road. Cost $18,000.

DEFIANCE.—Bids will be opened Aug. 4 for the construction of bridges in this county. S. I. Gruner, auditor.

DEFIANCE.—A $65,000 bond issue was recently sold to partially take care of the cost of constructing bridges taken out by the March floods.

ELYRIA.—The Weller Meter Co. has been incorporated to manufacture water meters, etc.; $10,000; by G. L. Weller, W. G. Sharp, D. J. Nye, H. H. Nye, and W. T. Bentz.

GIBSONBURG.—Frank E. Lamb, of Lima, has been elected president and general manager of the National Motor Truck & Mfg. Co., recently organized and capitalized at $250,000.

MANSFIELD.—The Richland Mfg. Co. has been incorporated to manufacture cranes, shovels and machinery; $100,000; by E. R. Diehm, C. C. Owens, F. T. Clark, T. M. Kirby and D. McBride.

SHELBY.—The Shelby Foundry Co.'s plant was struck by lightning July 17, and foundry damaged by the resulting fire. The damage is estimated at $60,000.

STEUBENVILLE.—Bids will be opened Aug. 19 for the construction of several steel bridges in this county. John L. Mead, county auditor.

TOLEDO.—The Power Equipment Co. recently closed a contract with the Toledo, Bowling Green & Southern Traction Co. for 1,016 horsepower Stirling water tube boilers, to be installed in its plant at Bowling Green, O.

WARREN.—Bids will be opened Aug. 11 for the construction of several bridges in this county, plans for which are on file with Wilbur J. Watson, Leader-News building, Cleveland.

YORKVILLE.—The new 12-mill plant of the Wheeling Sheet & Tin Plate Co., of which Isaac M. Scott, former head of La Belle Iron Works, Steubenville, O., is president, is rapidly nearing completion and will be in operation in October.

ZANESVILLE. — The Southeastern Ohio Railway, Light & Power Co. is planning to extend its line to Fultonham and White Cottage.

OREGON

EUGENE.—Mortgage for $800,000 has been given by Penn Timber Co. of Warren, Pa., on approximately 32,000 acres of timber. Sawmill will probably be constructed.

KLAMATH FALLS.—Fire caused loss of $8,000 to government saw mill and electric light plant near Klamath Agency. Some insurance.

PORTLAND.—Contract has been signed with the Independent Bridge Co., Pittsburgh, by Major J. J. Morrow, engineers corps, U. S. Army, for 11 pairs of steel gates for Dalles Celilo canal to cost $182,000.

PORTLAND.—The Northwest Steel Co., maker of structural steel, tank and flange plates, advises its proposed plant will be built about Jan. 1, and will be used for fabricating steel. One 15-ton crane is the only equipment which will be bought.

BANDON.—Plans for $60,000 sewer system have been approved by council.

PENNSYLVANIA

BEAVER FALLS.—The Penn Bridge Co., contractor and manufacturer of bridges and structural material, is just completeing a 70-foot traveling crane for use in its loading yard, and has completed the installation of an additional steam hammer in its forge shop, and is installing new lathes and drills in the machine shop.

CHESTER.—Three explosions in rapid succession dismantled a portion of the Delaware River Steel Co.'s plant, recently. The loss is estimated at $2,000.

CORRY.—The Ajax Iron Works advises it is considering building a foundry, but definite plans have not been decided upon.

ERIE.—The Erie Board of Trade, Twenty-three Club and civic organizations are endeavoring to secure the issue of $2,000,000 municipal bonds for the covering of Mill creek. Steel and reinforced concrete construction is under consideration.

ERIE.—Permit has been obtained by the Continental Rubber Works Co. for a structural steel and reinforced concrete addition to the main plant at Twentieth and Plum streets. The building will be 75 x 225 feet, four stories, involving the expenditure of $120,000. The excavations have been completed for the addition.

MT. JEWITT.—The Dewitt Muffler Co. was recently incorporated with a capital of $30,000. Clarence E. Dewitt, chief incorporator.

PARNASSUS.—The machine shop and two small foundries of the Standard Railway Equipment Co. were recently damaged by fire.

PHILADELPHIA.—The Boston & Maine railroad has placed an order for the construction of a shop building at Mechanicsville. N. Y. L. F. Shoemaker & Co., Philadelphia, will do the steel work.

PHILADELPHIA—Contracts have been awarded by the New York, West Jersey & Sea Shore railway for the construction of shops and power house at Atlantic City, N. J. The Belmont Iron Works, Philadelphia, will erect the steel work.

PHILADELPHIA.—A contract for a double-track steel bridge at Benwood, W. Va., on the Baltimore & Ohio railroad, was recently awarded to the Dravo Contracting Co., Pittsburgh. The contract for the superstructure will be let in the near future and the bridge completed without delay.

PHOENIXVILLE.—The Maine Coated Paper Co., Rumford Falls, Me., has placed an order with the Phoenix Bridge Co., Phoenixville, for the erection of a mill building.

PITTSBURGH.—The Epping - Carpenter Pump Co. ha sconcluded plans for the doubling of its foundry capacity.

PITTSBURGH.—The Jones & Laughlin Steel Co. has received permits to erect a coal hoisting pier in the Ohio river at West Economy, Pa.

PITTSBURGH.—The Pittsburgh Screw & Bolt Co.'s new plant will be operating within a few weeks. Part of the plant was formerly occupied by the Riter Conley Mfg. Co., which moved to Leetsdale, Pa.

PITTSBURGH.—The Carlin Machinery Co., Pittsburgh, has received an order from Frank D. McEnteer, consulting engineer for the York Bridge Co., Charleston, W. Va., for a twin cylinder double drum hoisting engine.

PITTSBURGH.—As a result of the closing of the First-Second National bank of Pittsburgh, in which the Kuhns were interested, work on the hydro-electric development on the Cheat river, at Cheat Haven, Pa., has been stopped.

PITTSBURGH.—A. F. Plock, Park building, recently received contracts for installing the Hinkel safety device on the blast furnace elevators of the Ohio Iron & Steel Co., Lowellville, O., Wellston Iron & Steel Co., Wellston, O., and the Northern Iron Co., Standish, N. Y.

PITTSBURGH.—It is unofficially announced that the Pennsylvania Railroad Co. is preparing to spend an enormous sum for the elimination of grade crossings. The expenditure includes improvement the company is making in elevating its tracks from East Liberty to Wilkinsburg, Pa.

PITTSBURGH.—The Summers Steel Car Co., Oliver building, has begun the delivery of 100 all-steel box cars for handling Portland cement to the Bessemer & Lake Erie railroad. Inside measurements of the cars are: Length, 40 feet; width, eight feet 10 inches; height, eight feet; capacity, 100,000 pounds; weight, 45,000 pounds.

PITTSBURGH. — The Dravo Contracting Co., Diamond Bank building, has received a contract for the construction of the substructure for a double track steel bridge at Benwood, W. Va., for the Baltimore & Ohio railroad. The bridge will be about 1,000 feet long. The contract for the superstructure has not yet been awarded.

PITTSBURGH. — The government has awarded the Independent Bridge Co., this city, a contract for the erection of lock gates in the Coosa river, Ala., and the Columbia river, Oregon. The Coosa river improvement includes two pairs of gates for Lock No. 4 and the Columbia river contract provides 22 pairs of gates, ranging from 36 feet to 50 feet in height, requiring 1,100 tons of structural steel.

SCRANTON.—The Electro-Steel Products Co. has been incorporated; $1,000,000; by H. O. Bernhardt, C. H. Pond and J. H. Hungerford.

UNIONTOWN. — The Consolidated Connellsville Coke Co. and the Bessemer Coke Co. have been granted permits by the Pennsylvania State Water Supply Commission to wall Cats run, in Fayette county, Pa.

WAYNESBORO.—The Waynesboro Metal

Foundry Co. is planning to build an addition to its plant, Georgia.

CAIRO—The Pelham & Havana Ry. Co. has started the erection of its machine shop and roundhouse here. E. Wilkinson, superintendent.

RHODE ISLAND

PROVIDENCE.—The William H. Haskell Mfg. Co. is preparing plans for an extension to its plant and work will start soon under the supervision of Lockwood, Greene & Co., Boston. The Haskell company manufactures bolts, nuts, washers and screws. Jacob Stevens, manager.

TEXAS

DALLAS.—Bids will be received at the United States engineers office until Aug. 9 for furnishing iron and steel, etc.

OAKWOOD.—The Oakwood & Trinity River Southern Railway Co. has been organized with a capital of $100,000 to construct a railroad from Oakwood to Madisonville, Tex., a distance of 50 miles.

VAN HORN.—The Horn Valley Railway Co. has been incorporated to construct a line from Lobo to a point in New Mexico, a distance of 95 miles; $100,000; by R. H. Owen, F. J. Cummings, J. E. Hayes and others.

WACO.—The commissioners have voted to build two bridges in this county, one 130-foot and the other 70-foot span.

VERMONT

BRATTLEBORO.—The National Automatic Machine Co., recently incorporated with a capital of $800,000, will move its headquarters and plant here from Providence, R. I. The following officers have been elected: President, D. E. McElhinny; treasurer, John R. Ryder; clerk, E. C. Crosby.

WASHINGTON

ANACORTES.—A. D. Bowen, president of Anacortes & Eastern Railway Co., announces that negotiations with C., M. & St. P. for the construction and operation of road two and one-half miles long, first unit of line to Mt. Vernon, through LaConner, have been closed.

BREMERTON.—Pawling & Harnischfeger, Milwaukee, Wis., have been awarded $16,825 contract for furnishing traveling cranes for navy yard.

EVERETT.—Sumner Iron Works is receiving bids for construction of foundry, machine shop, boiler shop, forge shop, wood work shop, pattern shop and pattern storage building.

EVERETT.—Hugh W. Evans and associates have asked the Commercial club to cooperate with them in securing installation of saw mill cutting about 20,000 feet daily, somewhere between Silver lake and Thomas lake, to take care of timber owned by them.

GLENDALE.—Fire almost totally destroyed Dickerson mill.

NIGHTHAWK.—Chas. A. Andrus, Will C. Jones, both of Nighthawk, have incorporated the Hope Mining Co., for $1,000,000.

OLYMPIA.—Chas. A. Harmony, Olympia Water Works Co., announces that electric pump is to be installed in water-works station and also a tank and electric pump at Westside.

POMEROY.—Farmers and land owners along route of proposed steam railroad from Snake river, via Ledgerwood ranch on Alpowa ridge, and W. L. Whitmore place, on the Deadman, will donate land and promote enterprise, incorporating for $25,000.

SEATTLE.—Articles of incorporation have been filed by Frank Griffin, W. E. Fry, both of Seattle, for Oro Placer Co.; $1,000,000.

SEATTLE.—The Pomeroy Mining Co. has been incorporated for $1,000,000 by S. G. Reading and H. M. Lambert, both of Seattle.

SEATTLE.—F. A. Leonard, Caroline Leonard, et al., Seattle, have incorporated the Milwaukee Oil Co. for $1,000,000.

SEATTLE.—The Puget Sound Cement & Limestone Co., 526 New York block, Seattle, advises it plans building soon the first unit of a 3,000-barrel plant, of steel and concrete. No equipment has been bought.

SEATTLE.—J. M. Sparkman, C. E. Lawson, H. A. Emery and E. W. Woods have incorporated with capitalization of $100,000 for manufacture of a new transmission device for automobiles. Temporary plant at Second and Seneca. New building contemplated.

SPOKANE.—The O., W., R. & N. Railroad Co. is planning to build an addition to its repair shops here.

TACOMA.—Star Iron Works incorporated for $12,000, by C. M. Hansen, G. D. Newbegin, et al., Tacoma.

WEST VIRGINIA

NEWELL.—The Newell Bridge & Railway Co. has been incorporated to construct a bridge and street railway across the Ohio river; $500,000; by S. Newell, D. McBride, C. C. Owens, E. R. Diehm and H. T. Clark, all of Cleveland.

WHEELING.—At a recent meeting of stockholders of the Whitaker-Glessner Co., it was voted to increase capital stock from $5,000,000 to $7,000,000.

WISCONSIN

CEDAR GROVE.—The Wisconsin Foundry & Steel Works has recently increased its power facilities to meet the demands of its enlarged plant. The large new boiler was furnished by the Optenberg Iron Works, of Sheboygan, Wis.

MANITOWOC.—Notice has been received by President Frank Hoffman of the Manitowoc Citizens' Association from C. B. Boehm, of the Aluminum Castings Co., Cleveland, that the Manitowoc plant, idle since May 1, will be in full operation by Aug. 1.

KENOSHA.—The Littand Mfg. Co., of Kenosha, has increased its capital stock from $25,000 to $40,000, and will enlarge its works. The company manufactures brass and bronze castings.

MILWAUKEE.—The Federal Pressed Steel Co., maker of seamless steel products, advises its new plant will be devoted to hydraulic and power press work. The equipment is being installed. It will permit the handling of heavy stampings of all kinds.

MILWAUKEE.—The Milwaukee county board has finally adopted the plans and specifications of Leenhouts & Guthrie, architects, Miller block, Milwaukee, for the proposed new house of correction group at North Milwaukee, involving a total expenditure estimated at $650,000. No further action will be taken until the September meeting.

MILWAUKEE.—The assets of the Wisconsin Engine Co., Corliss, Wis., bankrupt, will be sold at public auction at the plant on Aug. 18, according to an order issued by Referee E. Q. Nye, at Milwaukee. The real estate consists of 200 acres of land and the shops and equipment are said to be worth in excess of $345,000.

RACINE.—The C. H. Driver & Kerr Co., organized here with $25,000 capital, has taken over the Driver Mfg. Co., manufacturing sand-paper machinery, and will at once greatly increase the facilities and extend the line of articles manufactured.

RACINE.—C. A. Hamilton has resigned as vice president of the Lavigne Gear Co., Racine, and is preparing to develop some ideas of his own in connection with cyclecars and cyclecar motors. It is his intention to locate a factory and workshop in Racine at once, to carry on experimentation and tests.

RACINE.—The Sterling Mfg. Co., of Racine, the incorporation of which was recently noted, is contracting with other concerns for temporary manufacture of its metal specialties, awaiting the construction of its own plant. The company has a capial stock of $10,000. Officers have been elected as follows: President, C. C. Gittings, vice president, E. L. Osborne; treasurer, George Shurt; secretary, L. Powell.

SHEBOYGAN.—The Optenberg Iron Wks., Sheboygan, will erect a large new shop before the end of the year. The company manufactures marine and stationary boilers and machinery.

SUPERIOR.—The board of supervisors of South Range township, Douglas county, will receive bids until Aug. 15 for erecting a steel bridge on concrete substructure, over Amnicon river. R. N. Evans is county clerk.

Notice of Sale!

IN RE

Dissolution Hecla Iron & Mining Co.

IN pursuance to an order of court, the undersigned Receivers on September 22nd, 1913, will offer for sale at public auction, at the front door of the Court House in Ironton, Ohio, 6177.53 acres more or less of land in fee simple, on which are blast furnace, several barns and about eighty dwelling houses, and also 7113.36 acres of minerals, mining rights, rights of way and interests in land in all 13290.89 acres, situate in Lawrence County, Ohio. Appraised at $110,709.17. Upset price fixed by the court at $85,000.

Said land is extensively underlaid with coal, iron ore, limestone, clays, ganister rock and other minerals.

For further information call upon or address

A. C. ROBISON,
THOS. D. SHIRKEY,
Receivers

Ironton, Ohio

DOMINION OF CANADA

ALBERTA

BASSANO.—Tenders will be received by George B. R. Bond, secretary-treasurer, until Aug. 15, for all labor and materials necessary for the construction of sewage disposal works, consisting of tank and filter and relative works.

MEDICINE HAT.—The Northern Electric Co. has been awarded the contract for installing a fire alarm system at a price of $10,840.

MEDICINE HAT.—The Medicine Hat Pump & Brass Mfg. Co., Ltd., will erect a plant here costing $50,000.

MEDICINE HAT.—A wholesale hardware warehouse will be erected in Medicine Hat by the Trites-Wood Co., of Fernie, B. C.

REDCIFFE.—The Hammond Stoker Co. will build a plant here for the manufacture of grain shockers, at a cost of $75,000.

BRITISH COLUMBIA

LYTTON.—Details in regard to the new highway bridge to cross the Thompson river, near Lytton, show that it will have a substructure of concrete with steel superstructure. There will be 209 feet of trestle approach; the bridge will consist of a 250-foot truss span, 33 feet high, together with two 70-foot plate girder spans and a 50-foot plate girder span carried on steel bents and concrete abuttments.

NEW WESTMINSTER.—The British Columbia government is conferring with the Canadian Pacific railway authorities with a view to securing the steel superstructure of the present railway bridge across the Pitt river and placing it on the concrete substructure of the new government bridge across the same stream.

VANCOUVER.—The erection of a floating dock 12,000 to 15,000 tons for Vancouver harbor has been recommended to the Vancouver board of trade. It would be 600 feet long and would cost about $650,000.

VANCOUVER.—The Granby Consolidated Co. is building a smelter and converter plant at its property at Hidden Creek, B. C., with a capacity of 2,000 tons daily. Excavations have been made to install an ore-crushing plant.

VANCOUVER.—Tenders will be received until Aug. 21 by R. C. Desrochers, secretary

Penton's Book News

Publishers and Book Handlers

CLEVELAND

A Few of our Standard Publications.

PRACTICAL ALLOYING. By John F. Buchanan	$2.50
ALLOYS (Non-Ferrous). By A. Humboldt Sexton	3.25
ALLOYS AND THEIR INDUSTRIAL APPLICATION. By E. F. Law	4.50
ALUMINUM PRODUCTION AND ITS INDUSTRIAL USE. By Adolphe Minet	2.50
METHODS OF CHEMICAL ANALYSIS AND FOUNDRY CHEMISTRY. By Frank L. Crobaugh	2.00
THE BLAST FURNACE AND THE MANUFACTURE OF PIG IRON. By Robert Forsythe	3.00
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HOW TO MAKE CONVERTER STEEL CASTINGS. By Arthur Simonson	.75
THE CUPOLA FURNACE. By Edward Kirk	3.50
FOUNDRY PRACTICE. By R. H. Palmer	2.00
FOUNDRY WORK. By W. C. Stimpson	1.50
IRON AND STEEL (Encyclopedia) By Hugh Tiemann	3.00
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PATTERN MAKING. By James Ritchey	1.50
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THE PRODUCTION OF MALLEABLE CASTINGS. By Richard Moldenke	3.00
FOUNDRY DATA SHEETS. (An invaluable foundry manual)	1.50
BLUE BOOK OF AMERICAN SHIPPING. (The Standard American Marine Directory)	5.00
AMERICAN NAUTICAL ALMANAC	.50
USEFUL TABLES. (For the Navigator)	1.25
COURSE FINDER (For the Great Lakes). By Clarence E. Long	2.50
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GREAT LAKES RED BOOK. (A complete Great Lakes Shipping Directory)	1.00
HON. PETER WHITE. By Ralph D. Williams. (A historical sketch of the development of Lake Superior iron industry)	2.00
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SCOTT'S GREAT LAKES COAST PILOT	2.50
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THE LAKE SUPERIOR IRON ORE ANNUAL. (Statistical reports of Superior iron ore shipments, 1854-1912 incl.)	2.00
MY DEMON MOTOR BOAT. By Geo. Fitch	1.20
NAVIGATOR'S CHARTS. (Charts for the great lakes, rivers and coasts)	.50

We have other books on Electricity, Engineering, Fuels, etc., about which we would be pleased to furnish information upon request.

REMEMBER

"Any Book on Any Subject" is our Serving Capacity.

PENTON'S BOOK NEWS

CLEVELAND

of the Department of Public Works, for the construction of a wharf. Plans and specifications may be obtained from C. C. Harsfield, of New Westminster.

VICTORIA.—Contracts in connection with the sewer system have recently been awarded as follows: 1,500 feet of 2-inch iron pipe, Geo. A. Powell & Co.; 3,000 feet of 12-pound rails and fasteners, E. G. Prior & Co.; 1,000 feet of 8-inch galvanized pipe, Mussens, Ltd.

MANITOBA

WINNIPEG.—Two contracts have been awarded by the city. One is that of an extension to the power station awarded to the Fort Garry Consruction Co. at $35,800; the other for supplying three 5,000-kilowatt generators and spare parts, awarded to Vickers, Ltd., of Montreal, for $96,318.

ONTARIO

BRAMPTON.—The Massey-Harris Co., of Toronto, has purchased a site in Brampton, Ont., for a gasoline engine plant. Plans are now being prepared.

BRANTFORD.—The Brantford Machine & Foundries, Ltd., plans to erect a foundry in Brantford. It will probably be a one-story building and is estimated to cost $20,000.

COBALT.—Plans have been drafted by the Jupiter Mining Co. for its proposed new mill for which ore is now being blocked out.

FT. WILLIAM.—The Great West Wire Fence Co. has entered into a contract with the city whereby it will erect a plant to cost not less than $100,000.

FORT WILLIAM.—The contract for the construction of tunnels under the Kaministiquia, McKellar and Mission rivers has been conditionally awarded to the Moran Construction Co., of Smith's Falls, Ont., though the company has not as yet complied with all the regulations laid down by the city council.

FORT WILLIAM.—Extensive improvements to the Kaministiquia Power Co.'s plant, which will mean an outlay of approximately a million dollars, will be commenced in the very near future, according to R. S. Kelsch, consulting engineer for Hosmer, Holt & Thompson, Montreal, the principal owners of the plant. It is the intention to install a third big aqueduct, and surveys are to be commenced at once.

GALT.—Canadian Motors Co., Ltd., has obtained a charter of incorporation, with $40,000 authorized capital, to manufacture automobiles and parts of same. George A. Dobbie, Frank S. Scott and Edwin J. Getty are provisional directors.

GUELPH.—The Aspinwall Mfg. Co., Jackson, Mich., manufacturer of potato machinery, is planning a considerable enlargement to its plant here.

HAMILTON.—The Otis-Fensom Elevator Co. will make an addition to its factory here, at a cost of $20,000.

LONDON.—The Dominion Metal Specialties Mfg. Co., Ltd., has been incorporated with $40,000 capital, the provisional directors being Charles E. Santo, James S. Ferguson and John Harvey.

NEW LISKEARD.—Tenders will immediately be called for the laying of water main extensions and sewers in New Liskeard. There will be 4,000 feet of water main extensions and 3,000 feet of sewer.

ORILLIA.—The pattern house and large storage shops of the E. Long Mfg. Co. were destroyed on July 26, when a fire broke out at the company's foundry. The damage will amount to about $5,000.

OTTAWA.—The government has awarded the contract for steel work on a freight shed to be built on the Lachine canal to the Canadian Bridge Co., Ltd., for $16,595.

OTTAWA.—According to reports received by the Railway and Canals Department, grading has been completed on 20 miles of the Hudson Bay railway; a bridge over the Saskatchewan river at La Pas has just been completed at a cost of $300,000, and by fall half the line will have been completed.

OTTAWA.—Tenders will be received up to Aug. 28 for the construction of a single screw steel steamer, 164 feet, 6 inches in length, to be delivered at the Dominion Lighthouse Depot, Prescott, Ont. Tenders should be addressed to the Department of Marine and Fisheries, Ottawa. The steamboat must be built in Canada.

OTTAWA.—The Dominion government has given the contract for the erection of 40 double-lock gates on the Trent canal for a distance of 40 miles from Trenton to Roger Miller & Sons, of Toronto. The figure is $250,000 and the contract is expected to be completed by the fall of 1914. A plant will be put up at Trenton by Miller & Sons, being transferred from the firm's present headquarters at Sault Ste. Marie for this purpose, and will be used in the construction of the gates.

OSHAWA.—Tenders will shortly be called for a turbine pump, all electrically driven with a capacity of 800 gallons per minute. Frank Chappell, town engineer, may be applied to.

SAULT STE. MARIE.—D. Jamieson & Son have been awarded a contract by the Dominion government for the installation of electric passenger elevators in public buildings at Sault Ste. Marie at $11,000.

ST. CATHARINES.—The Canadian Pacific railway will build immediately an electric line from Hamilton to the Niagara river. The city of St. Catharines is to bear one-half the cost of a bridge across the Welland canal.

ST. THOMAS.—The St. Thomas Brass Co. will build a one-story brass foundry in St. Thomas, at a cost of $25,000.

TORONTO.—The city council has decided to spend $1,000,000 for a machanical filtration plant on Toronto island, to supplement the existing slow sand filtration plant, constructed at a cost of $800,000.

TORONTO.—It is announced that the project of the Richelieu & Ontario Navigation Co. for a million dollar dock in Toronto has been abandoned as a result of the new viaduct plans for the city, which include a $5,000,000 dock for public use.

TORONTO.—The Canadian Pacific railway has let a contract to the John Hayman & Sons Co., of London, Ont., for approximately $26,000, for the construction of a one-story addition to its coach repair shops on Keele and West Toronto streets.

TORONTO.—The Hot Point Electric Heating Co., Los Angeles, Cal., will immediately build a large branch manufacturing plant here at a cost of about $250,000, employing about 200 men. Willis Booth is president of the company.

TORONTO.—A charter of incorporation has been obtained by the J. H. Sherrard Mfg. Co., Ltd., with an authorized capital of $175,000, to operate rolling mills and blast furnaces and manufacture steel. Arthur J. Morrison, Wm. S. Morlock, Norman B. Wormwith and others are named as provisional directors.

TORONTO.—On account of the plans arranged between the railway companies and the city for the construction of a railway viaduct along the water front, the Polson Iron Works will not be able to start work on the new dry dock until a site other than that selected has been procured. Two thousand tons of steel for the dry dock have arrived.

TORONTO.—The Crow Lake Ironland Co., Ltd., has been incorporated, with an authorized capital of $100,000, to take over from the Michigan Exploration & Mining Co. options to purchase mining properties in Marmora township, Hastings county. The provisional directors include Fred Smith, Wm. F. Bowen and James Parker.

TORONTO.—Boving & Co., of Canada, Ltd., who have recently acquired works at Lindsay, Ont., for the manufacture of hydraulic machinery, have been awarded the contract for large turbines and governors by the Hydro-Electric Power Commission of Ontario for the Wasdells Falls on the Severn river.

QUEBEC

MONTREAL.—The Quebec government has decided to build a provincial highway between Levis and Montreal through the eastern townships. The road will be about 250 miles long. It is expected that $10,000,000 will be spent in the near future for the betterment of roads in the province, for which additional staff and equipment will be needed.

MONTREAL.—A large iron foundry will be erected in Montreal this year by the Robert Mitchell Co., of that city. Details have not yet been announced. Among other buildings which will go up are a large factory building for the General Fire Extinguisher Co., and a stove foundry to cost $75,000, for the Canada Stove & Furniture Co., Ltd., of Montreal.

QUEBEC.—The Allan Steamship Co., of Montreal, is considering a plan for the extension of its property in this city.

SASKATCHEWAN

MOOSE JAW.—The Phoenix Tractor Co., Ltd., of Eau Claire, Wis., is contemplating the erection of a tractor plant in Moose Jaw, Sask. A Canadian company will be formed to run the plant.